FROM "SIT AND WAIT" TO "PROACTIVE REGULATION": A MODEL FOR ENVIRONMENTAL REGULATION OF PRIVATE PROPERTY

BY

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Let me start from the end: recent years indicate that the world is moving in the right direction by increasing environmental awareness and attempting to deal with immediate and long-term environmental threats on an ongoing basis. But the path to achieving these results—like any transition from one point to another—involves significant costs for some and severe consequences for others. Responsible governments, operating in accordance with the Precautionary Principle, will not sit and wait for the threat to materialize, but will act—whether through regulation or various market incentives—to thwart it. Despite the urgency of tackling environmental challenges, current property laws do not provide governments with instruments to estimate the costs and distributive consequences of their actions in advance. Therefore, current property laws adversely affect the willingness of governments to address environmental challenges and the public legitimacy of environmental regulation.

This Article proposes an innovative model for governments to address environmental challenges, which includes identifying the unique characteristics of environmental regulations. Environmental regulation is characterized by urgency, absence of scientific certainty, irreversibility, and sometimes cross-border damage. When examined through the main justifications for compensation—efficiency and fairness—these characteristics enable decision-makers to formulate a clear policy in cases where environmental regulation harms private property. Specifically, the balance between these characteristics of environmental regulation allows decision-makers to know in advance the costs of regulation and the distributive implications of its implementation. This information enables governments to select the appropriate governmental power to exercise in response to any threat and the extent of their liability to compensate injured property

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owners. The ability of decision-makers to know in advance the economic and social costs of environmental regulation increases the effectiveness and fairness of government action. This knowledge strengthens the ability of governments to deal with growing environmental threats.

I. INTRODUCTION

There are several measures that governments can follow to address environmental threats; however, they often negatively affect a landowner's private property rights. This is evident in a pending case before the U.S. Supreme Court (the Court). Specifically, on January 24, 2022, the Court granted certiorari in the case of *Sackett v. United States Environmental Protection Agency*,[1] on a fundamental environmental law question that has not yet been decided: What is the appropriate definition of "waters of the United States" (WOTUS) in the Clean Water Act (CWA)?[2] The *Sackett* Court may ultimately resolve this issue that was most recently addressed in the fractured 4-1-4 decision of *Rapanos v. United States*.[3]

At the center of the *Sackett* case is an Idaho couple, Michael and Chantelle Sackett, who purchased a vacant lot in 2004 to build their family home in a residential neighborhood of Priest Lake, Idaho.[4] In May

[1] 8 F.4th 1075 (9th Cir. 2021), *cert. granted*, 142 S. Ct. 896 (Jan. 24, 2022) (No. 21-454).

[2] Federal Water Pollution Control Act (CWA), 33 U.S.C. §§ 1251–1388 (2018).

[3] *Id.*; Rapanos v. United States, 547 U.S. 715 (2006).

[4] Brief on the Merits for Petitioners at 4, 8, Sackett v. U.S. Env't Prot. Agency, 142 S. Ct. 896 [hereinafter *Sackett* Brief].

2007, a month after the Sacketts began construction of their home and obtained all necessary local permits, officials from the United States Environmental Protection Agency (EPA) and the United States Army Corps of Engineers (Corps) entered the lot and informed the Sacketts' construction workers that the homesite contained "wetlands" subject to federal regulation as "navigable waters" under the CWA.[5] These officials directed that all work should cease until the Sacketts obtained federal approval in the form of a CWA permit from the Corps.[6]

The legal question underlying the *Sackett* case is which lands are defined as wetlands requiring development approval from the federal authorities.[7] Although the Court has previously rejected broad definitions given by EPA,[8] it has not formulated a uniform test for that definition. For example, the Sacketts claim that EPA and the Corps inappropriately asserted jurisdiction over their wetlands by applying Justice Kennedy's "significant nexus" test established in *Rapanos*,[9] and that these agencies should have relied upon Justice Scalia's narrower "continuous surface connection" test, also established in that case (i.e., wetlands must have a "continuous surface connection" to a "relatively permanent" "water of the United States" for CWA jurisdiction to be applicable).[10] Since *Rapanos*, lower courts, and regulators, are uncertain on which test is proper when determining if a water body constitutes a water of the United States.[11]

Opinions regarding the implications of the ruling are divided. While some believe that the harm done to the Sacketts is disproportionate and significantly impairs their property rights, others believe that their claim is opportunistic, mainly because they knew about the condition of the property before they bought it.[12] While the *Sackett* case stands before the Court, it nevertheless tells a much broader story about how environmental regulations can adversely affect a landowner's private property rights and lead to a number of different implications as discussed further below.

For decades, the courts, as illustrated in both *Rapanos* and *Sackett*, have tried to formulate a clear policy regarding environmental regulations that harm private property. On the one hand, a liability rules-based policy was formulated due to the severity of the environmental threats and the increasing extent of the environmental damage.

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[5] *Id.* at 9, 18–19.

[6] *Id.* at 9 (internal citation omitted).

[7] *Id.* at 4.

[8] *See id.* at 11–17 (explaining the breath of EPA's regulatory definitions and the narrowing effects of the jurisprudence that followed).

[9] *Id.* at 45.

[10] *Id.* at 16–17 (internal citations omitted).

[11] *Id.* at 52.

[12] *See, e.g.*, *In* Sackett v. EPA, *the U.S. Supreme Court Could Soon Gut the Clean Water Act at Polluters' Request*, EARTHJUSTICE (Oct. 3, 2022), https://perma.cc/Z6MH-E6LV (commenting that the Sacketts purchased land, including sensitive wetlands, and rather than applying for a permit to fill the wetlands, the Sacketts sued the EPA in order to "blow a hole in the Clean Water Act").

According to this policy, governments at the federal, state, and local levels can infringe on private property to address environmental challenges. Thus, for example, a government can determine land uses, restrict development on certain lands of environmental value, and base the issuance of development permits on conditions that comply with environmental requirements. On the other hand, courts have not formulated a clear policy concerning compensation to property owners who suffer the imposition of restrictions on or expropriation of their property for environmental purposes. Despite establishing several categorical rules (such as emergencies,[13] physical invasion of land,[14] and complete denial of any viable use of land[15]), most environmental regulations that harm private property are examined in a consequential, ad-hoc manner.[16]

The lack of a clear formula concerning environmental regulation undermines attempts by governments at various levels to deal with environmental threats, as it prohibits them from pre-selecting the most appropriate means for dealing with them. Thus, a government confronting an environmental challenge that harms private property cannot be aware, in advance, whether it will owe compensation to the property owners or whether it is exempt from paying compensation. Nor can property owners plan their investments or know, in advance, the scope of their rights. In this sense, both landowners and governments are adversely affected by the muddled, incoherent, and unpredictable jurisprudence concerning applicable governmental powers and economic consequences.[17] Government regulation of these challenges should focus on avoiding adverse effects to the environment.

Notwithstanding the above, today, more than ever, governments face significant environmental challenges and threats.[18] The scientific

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[13] *See, e.g.*, United States v. Caltex, Inc., 344 U.S. 149, 154 (1952) ("[T]he common law had long recognized that in times of imminent peril—such as when fire threatened a whole community—the sovereign could, with immunity, destroy the property of a few that the property of many and the lives of many more could be saved.") (internal citation omitted).

[14] *See, e.g.*, Cedar Point Nursery v. Hassid, 141 S. Ct. 2063, 2073 (2021) ("[T]he Court has long treated government-authorized physical invasions as takings requiring just compensation.").

[15] *See, e.g.*, Agins v. City of Tiburon, 447 U.S. 255, 260 (1980) ("The application of a general zoning law to particular property effects a taking if the ordinance does not substantially advance legitimate state interests . . . or denies an owner economically viable use of his land") (internal citation omitted); Lucas v. S.C. Coastal Council, 505 U.S. 1003, 1016 n.6 (1992) ("The cases say, repeatedly and unmistakably, that '[t]he test to be applied in considering [a] facial [takings] challenge is fairly straightforward. A statute regulating the uses that can be made of property effects a taking if it 'denies an owner economically viable use of his land.'") (emphasis and citation omitted).

[16] Susan Rose-Ackerman, *Against Ad Hocery: A Comment on Michelman*, 88 COLUM. L. REV. 1697, 1701–02 (1988).

[17] *Id.* at 1700–02.

[18] *See* Hans-O. Pörtner et al., *Summary for Policymakers*, *in* CLIMATE CHANGE 2022: IMPACTS, ADAPTATION AND VULNERABILITY: WORKING GROUP II CONTRIBUTION TO THE SIXTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 13–

community increasingly deepens its knowledge about the existence of threats and the extent of expected damage to humans, animals, and plants.[19] Research finds that environmental damage materializes daily in different parts of the planet and threatens human lives and health, activity of ecosystems, and supplies of water and food.[20] These threats and the enormous extent of their damage require governments to act immediately. Indeed, governments worldwide work to reduce environmental threats and limit greenhouse gas emissions; conserve natural resources; expand the treatment of air, water, and soil pollution; and promote greener energies.[21] These actions are significant changes from the existing situation and put humanity in a period of transition.

The severity of environmental threats and their diverse character require governments to cooperate internationally and establish basic principles for joint action. For example, the international community established the no-harm principle[22] and the principle of common but differentiated responsibilities (CBDR);[23] both aim to allow countries with different interests to cooperatively tackle environmental threats. Local governments understand that property rules—requiring owner consent—are ineffective; successfully addressing environmental threats requires liability rules that allow government action before those threats materialize.[24] Governments struggle to address environmental threats with the means at their disposal: economic incentives, regulation, and expropriation of private property. Naturally, and as the story of the

15 (Hans-O Pörtner et al. eds., 2022) [hereinafter IPCC 2022: SIXTH ASSESSMENT] (discussing short-term and long-term climate impacts).

[19] *Id.* at 33 ("The cumulative scientific evidence is unequivocal: Climate change is a threat to human well-being and planetary health. Any further delay in concerted anticipatory global action on adaptation and mitigation will miss a brief and rapidly closing window of opportunity to secure a livable and sustainable future for all.").

[20] *See generally id.* (discussing the potential risks that may occur in the near and distant future due to the effects of climate change).

[21] For a comprehensive and detailed comparative review of worldwide governmental environmental regulation, see COMPARATIVE ENVIRONMENTAL LAW AND REGULATION (Nicholas A. Robinson et al. eds., 2019). *See also For a Livable Climate: Net-Zero Commitments Must be Backed by Credible Action*, UNITED NATIONS, https://perma.cc/377M-UATH (last visited Dec. 18, 2022) (discussing net zero goals and how countries can be on track for meeting them).

[22] Benoît Mayer, *The Relevance of the No-Harm Principle to Climate Change Law and Politics*, ASIA PAC. J. ENV'T. L., 2016, at 79, 89–90.

[23] Joyeeta Gupta & Nadia Sanchez, *The Common But Differentiated Responsibility (CBDR) Principle Elaborated in Relation to Other Principles of Law*, *in* THE GLOB. CMTY Y.B. OF INT'L L. AND JURIS. 23, 24 (M. Cherif Bassiouni et al. eds., 2013) [hereinafter GLOB. Y.B.] (stating that the CBDR principle "require[s] that in the area of global problems, responsibilities are to be shared between countries based on an assessment of how much they have contributed to causing the problem and their ability to actually deal with it.").

[24] *See* Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089, 1092, 1092 n.7 (1972) (explaining generally that the property rule covers voluntary—i.e., consensual—transactions and requires less state intervention, while the liability rule covers compensation for harmed property and is "easily administered" by the state).

Sackett case demonstrates, those who bear the burden of these necessary steps are property owners.

This Article seeks to dispel the legal fog about property regulation and provide governments and property owners with a model for examining the impact of environmental regulation on private property. The Article further assesses the unique characteristics of environmental regulation and finds that four such characteristics may affect compensation to private owners for the harm they sustain. The first characteristic of environmental regulation is its urgency. Pressing environmental challenges require quick action from governments. In some cases, governments must take action to prevent immediate damage, while in others they must act immediately to ward off a long-term threat. The second characteristic is the scientific uncertainty characterizing much of environmental decision-making. Even though science increasingly reveals the characteristics of environmental threats, the extent of their damage, and the means to deal with them,[25] many environmental threats lack solid scientific confirmation. The third characteristic is concern about the irreversibility of the damage. This concern is a crucial element in governments' willingness to accelerate responses to environmental threats—they want to preserve their future discretion. Finally, an additional characteristic of environmental regulation is that the damage often crosses borders. Due to the global characteristics of environmental threats, there may be a distance between where the regulation is imposed and where the damage might materialize. This distance complicates a property owner's liability for damages that materialize outside the boundaries of their community, their state, and even their continent.

Identifying these characteristics is essential for describing the nature of environmental threats accurately. As this Article asserts, these characteristics play a crucial role in dispersing the legal smokescreen over environmental regulation that harms private property. According to the model proposed in this Article, the characteristics of environmental threats help determine whether a government imposing environmental regulation is required to compensate owners. Examining these characteristics through the justifications for compensation—fairness and efficiency—answers some of the most pressing and confusing questions occupying decision-makers and courts: Why should the government be exempted from compensation in emergencies? Why is compensation due when the government regulates without solid scientific certainty? Furthermore, what is the effect of cross-border damages on property owners' entitlement to compensation? The proposed model provides a coherent regulatory policy for tackling environmental threats. Using the proposed model, governments and property owners can plan their

[25] *See, e.g.*, Elham Ali et al., *Point of Departure and Key Concepts*, *in* IPCC 2022: SIXTH ASSESSMENT, *supra* note 18, at 121, 123–24 (Roberto Sánchez Rodríguez et al. eds. 2022) (discussing the challenges of climate change adaptation in sustainable development including the risk assessments and vulnerabilities).

responses to environmental challenges while internalizing the costs and distributive consequences associated with environmental regulation. This model makes it possible to prevent governments and property owners from being adversely affected by the ambiguity and incoherence that prevail in current law. It also reduces the risk of adverse effects to the environment.

This Article proceeds in five Parts. Part II addresses the mechanisms available to governments for tackling environmental threats. As this Part demonstrates, governments may deal with environmental threats through regulation, land expropriation, and a broad set of economic incentives and financial mechanisms. Part III deals with existing arrangements in current property law, how this law addresses environmental threats, and when a landowner may be entitled to compensation. As the Part suggests, governments addressing environmental threats can exercise their police power or the power of eminent domain. The use of police power requires compensation of the affected property owners, while the power of eminent domain exempts it from owner compensation. This Part further demonstrates that courts have not established a formula that allows advanced knowledge of the appropriate governmental power to exercise in a given case and what situations require compensation to the owner. Part IV explains the unsatisfactory nature of tests proposed by current property laws to determine government obligation to compensate property owners for harm from environmental regulations. The current tests, which are consequential and conducted ad hoc, fail to provide authorities with the information they need to exercise their power. Part IV suggests that the consequential and ad hoc nature of current property laws do not allow governments to internalize all the costs involved in regulating and decide how to fairly distribute the burden among citizens. Part V identifies the unique characteristics of environmental regulation: urgency, scientific uncertainty, irreversibility, and cross-border damage. Identifying these characteristics is crucial for understanding the nature of environmental threats. These characteristics also affect the mechanisms that governments may use to ward off environmental threats and, just as importantly, the entitlement of property owners to compensation for any resulting harm. Part VI demonstrates how the unique characteristics of environmental threats allow determinations of governmental power to be used in the circumstances of a given threat. The Part proposes a model that assimilates the unique characteristics of environmental regulations into the main justifications for compensation: efficiency and fairness. This model allows governments and courts to examine the effects and characteristics of environmental regulation and internalize the full range of economic, environmental, and distributive costs involved in its implementation.

II. ENVIRONMENTAL THREATS AND THE MECHANISMS TO TACKLE THEM

Overall, the emergence of environmental threats troubles global and local governments, however, they each tackle them to different extents.[26] Dealing with environmental threats is not easy, partly because of the significant variability between the characteristics of these threats and their consequences. For example, global threats such as climate change, sea-level rise, air pollution, and deforestation pose challenges requiring international cooperation and multi-system coping in various sectors.[27] Threats of a more local nature, such as water pollution, biodiversity loss, and toxins allow for more rapid and focused treatment. These characteristics naturally require different coping mechanisms and varying responsive tactics. The tension between the global and the local, the reversible and the irreversible, and the immediate and long-term threats make governments' responses to environmental threats particularly complex and challenging.

To promote effective policy that addresses environmental threats, governments hold three prominent instruments. First, governments may regulate the use of private property through their police power.[28] By promoting land use regulation—either by zoning or exactions[29]—governments aim to prevent environmental harm and address environmental threats by limiting a landowner's ability to use their property in environmentally harmful manner. Environmental regulation is not limited to land or its use. For example, the United States, either at the federal or state level, has regulations to reduce greenhouse gas emissions from power plants;[30] reduce the use of plastic and its products (whether in the form of a ban on the sale of plastic bags or through

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[26] *See, e.g.*, *About Us: UNDP Climate Change Adaption*, UNITED NATIONS DEV. PROGRAMME, https://perma.cc/L8G6-YS2C (last visited Dec. 19, 2022) (detailing the UNDP's work supporting local and national governments as they implement community resilience projects across seven thematic areas, such as Ecosystem-Based Adaption and Water and Coastal Resilience); Ali et al., *supra* note 25, at 127 ("At the national level, over 2,315 laws and policies that address climate change now exist in 196 countries and a number of territories as of May 2021. Sub-national and non-state actors, including city and state governments and firms and investors, have also increasingly launched climate actions.") (internal citations omitted).

[27] *See, e.g.*, Ayansina Ayanlade et al., *Africa*, *in* IPCC 2022: SIXTH ASSESSMENT, *supra* note 18, at 1285, 1311 ("Beyond cross-sectoral collaboration, international cooperation is vital to avert dangerous climate change as its impacts reach beyond the jurisdiction of individual states.").

[28] *See, e.g.*, Mugler v. Kansas, 123 U.S. 623, 668–69 (1887) (concluding that a state's police powers allow it to prohibit activities on private property "that are declared, by valid legislation, to be injurious to the health, morals, or safety of the community").

[29] *See* Timothy M. Mulvaney, *Legislative Exactions and Progressive Property*, 40 HARV. ENV'T L. REV. 137, 137 (2016) (defining exactions as "a term used to describe certain conditions that are attached to land-use permits issued at the government's discretion"); *see also* Timothy M. Mulvaney, *The State of Exactions*, 61 WM. & MARY L. REV. 169, 172 (2019) (stating that *Koontz* still gives "state's continued flexibility to regulate land use in service of the public").

[30] Carbon Pollution Standards, 40 C.F.R. §§ 60.5508–5580, 70.2–70.9, 71.2–71.9, 98.426–98.427 (2021).

recycling);[31] and reduce the spread of hazardous substances such as lead, trichlorethylene (TCE), and other toxins.[32] These regulations do not directly affect land or its values, but they may affect private ownership by individuals, manufacturers, and corporations.

Second, governments may use their eminent domain power, which allows them to confiscate private property for public use in return for just compensation.[33] When the government believes that acquiring a particular private property is necessary to prevent environmental damage or, alternatively, to deal with an environmental threat (think, for example, of land required to off-site hazardous waste landfills)[34] it can use eminent domain power to take the property for environmental conservation. The differences between police power and eminent domain power provide a significant volume of literature and case law.[35] The bulk of this literature deals with the question of when a regulation is not sponsored by police power, which exempts the government from paying compensation to property owners, and when a regulation is sponsored under eminent domain power, requiring compensation to property owners

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[31] *See, e.g.*, *State Plastic Bag Legislation*, NAT'L CONF. OF STATE LEGISLATURES (Feb. 8, 2021), https://perma.cc/KK3D-TDUA (listing all bans, fees, and other plastic reduction programs that states have enacted).

[32] For examples of such acts, see Toxic Substances Control Act, 15 U.S.C. §§ 2601–2692 (2018); Residential Lead-Based Paint Hazard Reduction Act of 1992, 42 U.S.C. §§ 4851–4856 (2018); Clean Air Act (CAA), 42 U.S.C. §§ 7401–7671q (2018); CWA, 33 U.S.C. §§ 1251–1388 (2018); Safe Drinking Water Act, 42 U.S.C. §§ 300f–300j-27 (2018); Resource Conservation and Recovery Act of 1976, 42 U.S.C. §§ 6901–6992k (2018); Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. §§ 9601–9675 (2018).

[33] *See* U.S. CONST. amend. V ("[N]or shall private property be taken for public use, without just compensation.").

[34] *See* Catherine E. Beideman, *Eminent Domain and Environmental Justice: A New Standard of Review in Discrimination Cases*, 34 B.C. ENV'T AFF. L. REV. 273, 291–93 (2007) (describing how the government chooses to site environmental hazards in low-income and politically disenfranchised communities).

[35] *See, e.g.*, Joseph L. Sax, *Takings and the Police Power*, 74 YALE L.J. 36, 37 (1964) (discussing eminent domain and takings under states' police power); D. Benjamin Barros, *The Police Power and the Takings Clause*, 58 U. MIA. L. REV. 471, 472 (2004) (exploring "the precise nature of police power and its lessons for clarifying the regulatory takings debate."); William B. Stoebuck, *Police Power, Takings, and Due Process*, 37 WASH. & LEE L. REV. 1057 (1980); WILLIAM A. FISCHEL, REGULATORY TAKINGS: LAW, ECONOMICS, AND POLITICS (1995); Joseph William Singer, *Justifying Regulatory Takings*, 41 OHIO N.U. L. REV. 601 (2015); Christopher Serkin, *Existing Uses and the Limits of Land Use Regulations*, 84 N.Y.U. L. REV. 1222 (2009); *see also* Pa. Coal Co. v. Mahon, 260 U.S. 393, 413 (1922) (holding that a regulation that severely diminishes the value of private property amounts to a takings and just compensation is required); Village of Euclid v. Ambler Realty Co., 272 U.S. 365, 387 (1926) (holding that zoning regulations will generally be upheld as long as there is some connection to the public welfare); Penn Cent. Transp. Co. v. New York City, 438 U.S. 104, 132–36 (1978) (stating a city does not need to pay compensation to a property owner under the Takings Clause when it designates their property as a landmark and limits its development); Lingle v. Chevron U.S.A. Inc., 544 U.S. 528, 538, 548 (2005) (stating that takings clause challenges to regulations had to be based on the severity of the burden that the regulation imposed upon the property rights).

for their loss.[36] What these two governmental powers have in common, however, is the underlying understanding that the government's duty to mitigate threats provides it with the power to interfere with private property. Through these two mechanisms, governments can act in fundamentally different manners to achieve environmental goals that restrict private property by incentivizing property owners to act in an environmentally sound manner.[37] Incentives such as grants, low-interest loans, favorable tax treatment, and procurement mandates enable governments to motivate property owners to act in an environmentally sound manner without regulatory intervention affecting private property.[38] The use of market-based incentives to motivate property owners to take environmentally sound action could solve environmental challenges without harming private property. On the other hand, their effectiveness—and therefore their contribution to tackling the environmental challenge—depends on many factors, such as the scope of these incentives, market competitiveness, and the urgency of addressing the environmental challenge.[39]

The choice to use a particular instrument is in the hands of governments. The government, in such cases, is the best agent to understand the extent of the environmental threat; the economic means available; and the possible implications for the economy, the environment, and society. On its face, the most efficient, quickest, and cheapest choice is regulation. The courts recognize the power of

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[36] *Lingle*, 544 U.S. at 532. *See also Pa. Coal Co.*, 260 U.S. at 414 (finding Pennsylvania's law prohibiting mining under a landowner's property to be an unconstitutional exercise of police power); *Village of Euclid*, 272 U.S. at 397 (finding zoning ordinances to be a valid exercise of state police power); *Penn Cent. Transp. Co.*, 438 U.S. at 138 (finding regulation of Penn Central as historical landmark a valid exercise of police power which did not require compensation); *Mugler*, 123 U.S. 623, 669–671 (1887) (finding the state law banning brewery from producing alcohol to be a valid exercise of police power not requiring compensation); Chicago & Alton R. Co. v. Tranbarger, 238 U.S. 67, 77–78 (1915) (finding the law requiring construction of suitable drainage along railroad tracks to be a valid exercise of police power not requiring compensation).

[37] For example, the EPA provides grants to businesses in order to help them develop and adopt source reduction practices. *See Grant Programs for Pollution Prevention*, ENV'T PROT. AGENCY (Dec. 2, 2022), https://perma.cc/5CPY-6RKD. The Clean Water State Revolving Fund (CWSRF) program provides communities low-cost financing for a wide range of water quality infrastructure projects. *See Clean Water State Revolving Fund (CWSRF)*, U.S. ENV'T PROT. AGENCY (Oct. 20, 2022), https://perma.cc/VS8Y-6BEQ. The EPA Environmental Justice Small Grants Program supports and empowers communities working on solutions to local environmental and public health issues. *See Environmental Justice Small Grants Program*, U.S. ENV'T PROT. AGENCY (May 10, 2022), https://perma.cc/CE9Y-QA55.

[38] For a comprehensive review of the American environmental incentive policy, see ROBERT C. ANDERSON, THE UNITED STATES EXPERIENCE WITH ECONOMIC INCENTIVES FOR PROTECTING THE ENVIRONMENT, U.S. ENV'T PROT. AGENCY EPA-240-R-01-001 i–vi, 223 (2001), https://perma.cc/BJ8A-NZAM.

[39] *Economic Incentives*, U.S. ENV'T PROT. AGENCY (Sept. 8, 2022), https://perma.cc/ACP4-3TRS.

governments to regulate land use[40] and other harmful activities for the environment (such as water and air pollution).[41] The legitimacy granted by the courts to impose regulations that operate under state police power exempts the regulating government from compensating property owners and makes regulation a cheaper means of dealing with environmental challenges. Legal recognition of governments' ability to regulate private resources and deal with environmental challenges, along with the coercive and binding nature of regulation and the relative velocity of its implementation, make regulation the main mechanism for dealing with environmental challenges.[42]

However, while regulations are generally approved by courts as a legitimate exercise of a state's police power—exempting governments from compensating owners—in some cases, this approval is challenged. Governments find that the boundaries between various mechanisms—especially between the state's police power and its eminent domain power—are unclear.[43] Regulating private property to deal with environmental threats may carry significant economic costs. This ambiguity sometimes embarrasses governments seeking to address environmental challenges. The lack of guidelines under which a government can plan its steps and evaluate the economic and social costs of its actions threatens the willingness of authorities to act, on the one hand, and the rights of private property owners on the other. A two-stage examination helps to understand the significance of this ambiguity in governments' ability to deal with environmental challenges that require private property regulation. The first stage of this examination points out the mechanisms currently proposed by property law for dealing with environmental challenges. The second stage addresses the failures that prevent governments from properly using property law to address these challenges.

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[40] *See, e.g.*, *Village of Euclid*, 272 U.S. at 375 (holding that the states have the power to "prevent[] one man from so using his property or rights as to prevent others from making a corresponding dull and free use of their property and rights" via zoning ordinances).

[41] R. SHEP MELNICK, REGULATION AND THE COURTS: THE CASE OF THE CLEAN AIR ACT 1–2 (1983); *see* West Virginia v. U.S. Env't Prot. Agency, 142 S. Ct. 2587, 2600 (2022) (addressing whether the EPA has the authority to regulate greenhouse gas emissions in virtually any industry, so long as it considers cost, non-air impacts, and energy requirements).

[42] *See generally* Anthony Heyes, *Implementing Environmental Regulation: Enforcement and Compliance*, 17 J. REGUL. ECON. 107 (2000) (providing an overview of the economic literature on the effectiveness of the environmental regulation enforcement methods).

[43] *See, e.g.*, *Penn Cent. Transp. Co.*, 438 U.S. 104, 124 (1978) ("[T]his Court, quite simply, has been unable to develop any 'set formula' for determining when 'justice and fairness' require that economic injuries caused by public action be compensated by the government, rather than remain disproportionately concentrated on a few persons.") (internal citation omitted).

III. PROPERTY LAW, THE GOVERNMENT POWERS THAT AFFECT PRIVATE LAND OWNERSHIP, AND THE RIGHT TO COMPENSATION

American property law recognizes two governmental powers that affect private property: police power and eminent domain power.[44] As the Court in *Berman v. Parker*[45] suggested, the former has no exact definition.[46] Traditionally, governments used the police power to protect the security, health, safety, morals, and welfare of the community and has been approved by the courts in regulations relating to health,[47] zoning,[48] prostitution,[49] and liquor.[50] Professor Joseph Sax argues that the "police power" is used by the courts to "identify those state and local governmental restrictions and prohibitions which are valid and which may be invoked without payment of compensation."[51] The eminent domain power, on the other hand, was set in the Fifth Amendment and prohibits taking of private property for public use without justly compensating its owners.[52]

Governments may need to regulate or take private property to address environmental threats. Consider, for example, a case where the government must build a dam to prevent flooding or where the government needs off-site hazardous waste landfills. In these cases, depending on the appropriate location, the government may be required to expropriate private property to address these environmental challenges. However, in other cases such as preserving a lake ecosystem, protecting wetlands, or preventing coastal erosion, the government can order that the land be used so it does not threaten the environment, instead of taking private property. Thus, for example, the government may impose a construction ban or guidelines regarding permitted development in wetlands in a way that does not expropriate the land from the owners but leaves it in their hands while subject to regulation. This is evident in the *Sackett* case where, pursuant to CWA, EPA ordered the Sacketts to remove the fill they placed on their property and return the lot to its natural state due to the presence of protected wetlands.[53]

Based on these examples, the distinction between a state's police power and its eminent domain power seems quite clear. When the state takes the individual's property, it exercises its eminent domain power.

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[44] *See* Sax, *supra* note 35, at 36 (explaining the difference between police power and eminent domain).

[45] 348 U.S. 26 (1954).

[46] *Id.* at 32 ("An attempt to define its reach or trace its outer limits is fruitless, for each case must turn on its facts."); *see also* Sax, *supra* note 35, at 37 ("[T]he predominant characteristic of this area of law is a welter of confusing and apparently incompatible results.").

[47] Holmes v. Jennison, 39 U.S. 540, 616 (1840) (Baldwin, J., concurring).

[48] *Village of Euclid*, 272 U.S. 365, 389–90 (1926).

[49] L'Hote v. City of New Orleans, 177 U.S. 587, 595–96 (1900).

[50] Beer Co. v. Massachusetts, 97 U.S. 25, 33 (1878).

[51] Sax, *supra* note 35, at 36 n.6.

[52] U.S. CONST. amend. V.

[53] *Sackett* Brief, *supra* note 4, at 19, 19 n.6.

When the owners preserve their ownership—even if the use of their property is regulated—the state exercises its police power. At an early stage, however, the courts recognized that this division did not correctly reflect the effect of the government's action on private property and that, in some cases, regulation of land use may in effect prevent the owners from any use, or economic value, of their property.[54] Such cases where the government allegedly regulates property use yet denies the owners viable use or economic value of their property, have led to suggestions by the Court of various tests to dispel the veil of fog around governmental actions that infringe on private property. Most of these distinctions were consequential. Thus, in *Pennsylvania Coal Co. v. Mahon*,[55] Justice Holmes established that the distinction between these two governmental powers would be made retrospectively, depending on the extent of the damage caused to the property owners.[56] Justice Holmes' determination that "while property may be regulated to a certain extent, if regulation goes too far, it will be recognized as a taking" served as a basis for the development of regulatory takings.[57]

Regulatory takings were further developed by the Court in *Penn Central Transportation Co. v. New York City*,[58] where it established a three-factor test to determine whether a regulation goes too far to be considered a taking or is still within the state police power.[59] Known as the *Penn Central* test, the Court suggested that whether a regulation is considered a taking depends on: (1) the economic impact of the regulation to the owner; (2) the extent to which the regulation interferes with the owner's distinct investment-backed expectations; and (3) the character of the governmental action.[60] The way the *Penn Central* test should be implemented has occupied both literature and courts; instead of providing clear tests so that the authorities can plan their actions, the *Penn Central* test leaves a great deal of ambiguity regarding exercised governmental power and, consequently, the entitlement of owners to compensation for the regulation of their private property.[61]

In some cases, courts are clearer. In three situations, courts have established categorical rules with respect to governmental action that interferes with private property. The first categorical rule deals with emergencies. In emergencies, courts have ruled that no compensation will

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[54] *Pa. Coal Co.*, 260 U.S. 393, 413 (1992).

[55] *Id.*

[56] *Id.* at 413.

[57] *Id.* at 415; San Diego Gas & Elec. v. City of San Diego, 450 U.S. 621, 648–49 (1981) (Brennan, J., dissenting).

[58] 438 U.S. 104 (1978).

[59] *Id.* at 124.

[60] *Id.* at 124–25.

[61] *See, e.g.*, Christopher Serkin, *Penn Central Take Two*, 92 NOTRE DAME L. REV. 913, 914 (2016) (discussing how there has been a lot of litigation over how the *Penn Central* test should be applied); Steven J. Eagle, *The Four-Factor* Penn Central *Regulatory Takings Test*, 118 PENN STATE L. REV. 601, 605, 605 n.21 (2014); Steven J. Eagle, Penn Central *and Its Reluctant Muftis*, 66 BAYLOR L. REV. 1, 2 (2014).

be awarded to the affected property owner—even if the state physically destroys the private property.[62] In essence, if the government destroys property as a result of an emergency, then a "necessity exception" relieves it of any obligation to compensate the owner of the property that was sacrificed for the public good.[63] Examples of such emergencies may include, inter alia, storm or flood mitigation, war, and the conversion of a motel into a hospital (e.g., for housing Covid-19 patients).[64]

Another categorical rule established by the Court relates to physical seizure of property. In cases where private property is seized, the court has ruled that the owner is entitled to compensation. As the Court in *Palazzolo v. Rhode Island*[65] phrased it: "The clearest sort of taking occurs when the government encroaches upon or occupies private land for its own proposed use."[66] The recent Court ruling in *Cedar Point Nursery v. Hassid*[67] confirmed that even in cases where regulations appropriate a right to physically invade private property, compensation is due.[68] The third categorical rule regarding regulations that affect the owners' use of their property is quite different from the former two and deals with regulations that do not entail the physical appropriation of private property. This categorical rule was established in *Lucas v. South Carolina Coastal Council*,[69] where the Court set a rule that a regulation denying *all* economically viable use of the land is a categorical taking that requires the government to compensate the owners.[70]

The three categorical rules established by the Court provide governments with preliminary knowledge about the costs and implications of their actions. When the government physically invades one's property, compensation is due.[71] It should also compensate the owners when it regulates to the extent that the property loses *all* economically viable use.[72] These categorical rules, however, leave a wide range of government actions designed to deal with environmental threats

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[62] *Caltex*, 344 U.S. 149, 154 (1952) ("[T]he common law had long recognized that, in times of imminent peril—such as when fire threatened a whole community—the sovereign could, with immunity, destroy the property of a few that the property of many and the lives of many more could be saved.") (internal citation omitted).

[63] Brian Angelo Lee, *Emergency Takings*, 114 MICH. L. REV. 391, 393 (2015).

[64] *Id.* at 400; Robert H. Thomas, *Evaluating Emergency Takings: Flattening the Economic Curve*, 29 WM. & MARY BILL RTS. J. 1145, 1171–72 (2021); *see, e.g.*, Taryn Luna, *Newsom Issues Order Allowing California to Take Over Hotels for Coronavirus Patient*s, L.A. TIMES (Mar. 12, 2020), https://perma.cc/7VQK-WC9G (detailing the executive order released by Governor Newsom to allow the state to seize hotels and other medical facilities to use in Covid-19 treatments).

[65] 533 U.S. 606 (2001).

[66] *Id.* at 617.

[67] 141 S. Ct. 2063 (2021).

[68] *Id.* at 2072–74.

[69] 505 U.S. 1003 (1992).

[70] *Id.* at 1015 ("The second situation in which we have found categorical treatment appropriate is where regulation denies all economically beneficial or productive use of land.") (internal citation omitted).

[71] *Cedar Point Nursery*, 141 S. Ct. at 2072–74.

[72] *Lucas*, 505 U.S. at 1015.

which are questioned as to the government's liability for owner compensation.[73] As Professor Susan Rose-Ackerman rightfully argues, both owners and governments are adversely affected by the muddled, incoherent, and unpredictable jurisprudence related to the applied governmental powers and their economic consequences.[74] Government regulation of these challenges should focus on avoiding adverse effects to the environment.

IV. WHY IS THE EXAMINATION OF CURRENT PROPERTY LAW FUNDAMENTALLY FLAWED?

The court in *Lingle v. Chevron U. S. A. Inc.*[75] suggested that owners have four different courses when that government interferes with their property:[76] first, they may allege a "physical" taking (referring to the categorical rule that any physical invasion of land requires compensation); second, they may argue for what the court termed a "Lucas-type" categorical regulatory taking (referring to the second categorical rule that a regulation that denies *all* economically viable use of the land requires compensation); third, owners may claim compensation in accordance with the *Penn Central* test for regulatory takings; and fourth, owners may challenge a land-use exaction violating the standards set forth in the following precedents: *Nollan v. California Coastal Comm'n*[77] and *Dolan v. City of Tigard*.[78]

The four courses provided in *Lingle* differ from each other. Some depend on the physical expropriation of private property while others address impact on the property's economic value. At the same time, all tracks—as the *Lingle* Court explicitly stated—examine the *result* of the regulation in a consequential ex-post examination.[79] In this sense, the state's obligation to compensate private property owners for environmental regulation arises only to the extent that the owners prove that their property was severely harmed—physically or financially—because of that regulation. According to the Court, the reason for an ex-post examination is that owners must prove harm to justify their compensation.[80] Further, the Court posits that the reason for

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[73] Consider the situation in *Palazzolo*, where the court concluded that a 94% diminution in value was not a categorical taking. *Palazzolo*, 533 U.S. 606, 616, 632 (2001).

[74] Rose-Ackerman, *supra* note 16, at 1700–01. Justice Stevens noted in his dissent in *First English Evangelical Lutheran Church of Glendale v. County of Los Angeles*, 482 U.S. 304 (1987), that "the Court has repeatedly recognized that it itself cannot establish any objective rules to assess when a regulation becomes a taking. How then can it demand that land planners do any better?" *Id.* at 340 n.17 (Stevens, J., dissenting) (internal citations omitted).

[75] 544 U.S. 528 (2005).

[76] *Id.* at 548.

[77] 483 U.S. 825 (1987).

[78] 512 U.S. 374 (1994).

[79] *Lingle*, 544 U.S. at 548.

[80] *Id.* at 539.

compensating property owners who are harmed due to a taking is based upon fairness.[81] For example, in *Armstrong v. United States*,[82] "[t]he Fifth Amendment's [just compensation requirement] . . . was designed to bar Government from forcing some people alone to bear public burdens which, in all fairness and justice, should be borne by the public as a whole."[83] Justifying compensation to balance distribution of burdens on society implies a consequential examination—it must be done *after* the extent of the burdens and the manner of their distribution are known.

Basing the obligation of governments to compensate landowners when their property is adversely affected by environmental regulation solely on the extent of either the physical or economic harm caused to their property raises several objections. First, not every physical invasion of land impairs the owner's ability to use the land or affects its economic value. As evidenced in the recent Supreme Court ruling in *Cedar Point Nursery*—where the question was whether a California regulation granting labor organizations a "right to . . . access" an agricultural employer's property to solicit support for unionization—that owners may be entitled to compensation for *any* physical invasion, including a temporary one, regardless of a permanent restriction of the owner's use of their property, or the scope and scale of the property's economic value.[84] In other words, the Court recognized that *any* physical invasion to one's property constitutes compensable takings, without requiring proof of use or economic harm. This understanding conflicts with the rationale sought by the Court in *Armstrong*, and was embraced by the *Lingle* Court, to serve as the basis for compensation.[85] As long as compensation is due for unfair consequences of the government's action or regulation—i.e., the desire not to force "some people alone to bear public burdens which, in all fairness and justice, should be borne by the public as a whole"[86]—a physical invasion to the land which does not carry with it any consequence to the owner's ability to make use of his property, or any economic harm, should not entitle the owners to compensation.

An alternative understanding of the ruling in *Lingle*, by which one must distinguish between physical taking and regulatory taking so that, in the former, the obligation to compensate owners arises regardless of the outcome or circumstances while, in the latter, the obligation to compensate arises only according to the results, is complicated. Consider, for example, the necessity exemption for takings, as referenced previously.[87] American courts consistently hold that governments destroying private property in an emergency are exempt from

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[81] *Id.* at 537 (internal citation omitted).

[82] 364 U.S. 40 (1960).

[83] *Id.* at 49.

[84] *Cedar Point Nursery*, 141 S. Ct. 2063, 2080 (2021).

[85] *See supra* notes 80–83 and accompanying text (discussing the *Lingle* Court's use of an ex-post test, considering the burdens and facts, to justify compensation based on fairness).

[86] *Armstrong*, 364 U.S. at 49.

[87] Lee, *supra* note 63, at 395.

compensating the harmed landowners.[88] To better understand this necessity exemption, it is important to clarify that the courts have not determined that the demolition of property in an emergency is within the state police power. Such determination would obviate discussion of the state's duty to compensate owners. Instead, courts chose to recognize that such governmental action—despite its emergency dimension—was part of the state eminent domain power.[89] Yet, in emergencies, the state is exempt from compensating owners for destruction of their property.[90] The necessity exemption for takings clarifies, therefore, that the state's obligation to compensate owners reaches beyond the physical dimension. Moreover, and as the necessity exemption for takings clarifies, even in cases where the taking has physical characteristics (e.g., destruction of a structure), the obligation to compensate depends on the *circumstances* of the government action and its causes.[91] This understanding is important not only to challenge the denial of considering the circumstances, as the Court held in *Lingle*,[92] but also to provide a normative framework for distinguishing between the state police power and its eminent domain power.

While ignoring the circumstances and objectives of government action in decisions regarding compensation to property owners is inconsistent with the ruling in relation to eminent domain, it also poses significant challenges to the activities of governments and their ability to regulate. Thus, basing the decision regarding compensation to owners solely on a consequential ex-post examination could harm not only the award of compensation, but the incentives available to authorities when they consider environmental regulation. Compensation determinations that are based on consequential ex-post examination requires ad-hoc determination.[93] Such examination, as Professor Susan Rose-Ackerman

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[88] *See, e.g.*, *Caltex*, 344 U.S. 149, 154 (1952) (holding that laws have "long recognized that in times of imminent peril—such as when fire threatened a whole community—the sovereign could . . . destroy the property of a few" to save others); *see* Thomas, *supra* note 64, at 1181 (discussing various precedent that supports the principle that some physical occupations or destructions in emergencies are not compensable events); Shelley Ross Saxer, *Necessity Exceptions to Takings*, 44 U. HAW. L. REV. (forthcoming 2022) (manuscript at 6); Lee, *supra* note 63, at 393; Shai Stern, *Taking Emergencies Seriously*, 51 URB. LAW. 1, 32 (2021).

[89] Lee, *supra* note 63, at 393.

[90] *Caltex*, 344 U.S. at 156.

[91] *See* Lee, *supra* note 63, at 401–07 (distinguishing circumstances that require compensation when the government engages in emergency takings from circumstances when they do not need to provide compensation).

[92] *See* discussion *supra* Part IV.

[93] *See* Keystone Bituminous Coal Ass'n v. DeBenedictis, 480 U.S. 470, 495 (1987) (quoting Kaiser Aetna v. United States, 444 U.S. 164, 175 (1979)) ("[T]his court has generally 'been unable to develop any 'set formula' for determining when 'justice and fairness' require that economic injuries caused by public action be compensated by the government, rather than remain disproportionately concentrated on a few persons.' Rather, it has examined the 'taking' question by engaging in essentially ad hoc, factual inquiries that have identified several factors—such as the economic impact of the regulation, its

argues, may have some merits in other areas of the law but is extremely problematic in the takings field, especially because it obscures the costs and consequences of the governmental action, thus deterring the government, as well as property owners, from proper planning of their action.[94] In other words, ad hoc determination, which is usually conducted in an ex-post manner, ignores another prominent justification for the compensation requirement for takings: efficiency. Along with the *Armstrong* ruling, which requires compensation because of fairness,[95] the literature suggests another, quite different, justification for compensation in takings. According to the efficiency justification for compensation, compensation is required to prevent the authorities from falling into a fiscal illusion while refraining from internalizing all the economic and social costs of their actions.[96] Additionally, the Fifth Amendment's just compensation requirement intends to enable authorities to assess, in advance, the costs of their actions and to realize the needs of the public while maintaining awareness of the cost of their realization.[97] Consequential ex-post examination of the regulation denies the ability of governments to pre-estimate the costs and effects of the regulations and leave them to ad-hoc determination by the courts. In essence, it prevents the establishment of comprehensive criteria for regulating activity and may frustrate regulatory decision making because of the overestimation of costs.

These failures suggest that consequential ex-post examinations of a regulation's effect on private property fail to provide a substantial and comprehensive framework for distinguishing between a state's police power and its eminent domain power. While both courts and scholars struggle to provide explanations and justifications to doctrines and past precedents, most agree that American jurisprudence still misses a comprehensive and coherent framework to determine the boundaries between these two important and controlling governmental powers.[98]

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interference with reasonable investment backed expectations, and the character of the government action—that have particular significance.").

94 Rose-Ackerman, *supra* note 16, at 1700–02.

95 *See supra* notes 82–83 and accompanying text.

96 The assumption behind the fiscal illusion argument is that government officials would likely engage in inefficient exercises of eminent domain because they tend to ignore costs that are not reflected in the budget and, if not required to pay compensation, will not take account of the costs their actions impose on private parties as long as those costs do not affect the budget. *See* Ronit Levine-Schnur & Gideon Parchomovsky, *Is the Government Fiscally Blind? An Empirical Examination of the Effect of the Compensation Requirement on Eminent-Domain Exercises*, 45 J. LEGAL STUD. 437, 438 (2016).

97 *Id.*

98 *See* Rose-Ackerman, *supra* note 16, at 1699–01, 1708–10 ("[T]he Court seems to be inordinately proud of the ad hoc nature of its takings opinions and has reiterated its support of case-by-case balancing in the current crop of opinions."); *see also* Richard A. Epstein, *Takings: Descent and Resurrection*, 1987 SUP. CT. REV. 1, 4 (1987) ("The results in three very important takings cases last term confirm anew that the Court's vacillations and indecisions have yet to run their course. The reason for the confused, and often contradictory, results is that the Supreme Court has never been prepared to give the

Past decisions reveal that neither the physical dimension nor the extent of harm provides a consistent and substantive means of distinguishing between these two governmental powers.[99] Nevertheless, for centuries, these two powers have played a significant role in American jurisprudence as powers that are different from each other, seeking to describe a different governmental activity.[100] The difference between the state's police power and its eminent domain power must involve a *substantial* difference related not only to the outcome of the government act, but also to the reasons for choosing either one as a means of implementing policy. In this sense, the ad hoc consequential test cannot be the only measure of the power used by the government to achieve its goals. The identification of the government power taken by the government retrospectively is incorrect not only utilitarianly but also jurisprudentially.

Providing a nuanced framework that distinguishes between compensable and non-compensable regulations is important because it has practical impact on the future of regulation and, therefore, on the ability of government to fend off current and future environmental threats. A framework that provides certainty and predictability to both owners and the government enables calculated regulatory risk management and grants legitimacy to regulatory actions. Such a framework must, therefore, be based not only on an ex-post consequential test, but also based on preliminary concerns related to the circumstances, reasons, and justifications for a regulatory decision. A re-examination of the Court's decision in *Lingle*, therefore, reveals that although it was correct in rejecting the "substantially advances" test adopted earlier in the case of *Agins v. City of Tiburon*,[101] it erred in basing the entire distinction between the state police power and its eminent domain power on an ex-post examination of regulatory results.[102] The rejection of the "substantially advances" test was correct because both powers were given to the government to further public interests. Neither one of them can be used arbitrarily or to benefit individuals.[103] The determination of which power the government uses in a certain instance cannot, therefore, be

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Takings Clause the natural reading that its text suggests. Instead it has contented itself with the general observation that there is no 'set formula' for takings cases and that 'essentially ad hoc, factual inquiries' are the best that it can do in so complex an area—usually as a prelude for denying the constitutional claim.") (internal citations omitted).

[99] *See, e.g.*, *First Eng. Evangelical Lutheran Church*, 482 U.S. 304, 330, 332–33 (1987) (Stevens, J., dissenting) ("It is obvious that no one of these elements can be analyzed alone to evaluate the impact of a regulation, and hence to determine whether a taking has occurred.").

[100] Sax, *supra* note 35, at 37.

[101] 447 U.S. 255, 261 (1980).

[102] *Lingle*, 544 U.S. 528, 545 (2005) ("For the foregoing reasons, we conclude that the 'substantially advances' formula announced in *Agins* is not a valid method of identifying regulatory takings for which the Fifth Amendment requires just compensation.").

[103] *See* Everett V. Abbot, *The Police Power and the Right to Compensation*, 3 HARV. L. REV. 189, 196 (1889) ("Except for the direct benefit of the whole community no man should be compelled to improve his estates against his will.") (internal citation omitted).

dependent on the underlying public interest. However, the court in *Lingle* erred when it assumed that rejecting the "substantially advances" test discards *any* reference to the circumstances underlying the exercise of government power, or to the justifications and urgency of that power's exercise.

Enabling governments to address environmental threats fairly and efficiently requires providing them with governing powers and unambiguous guidelines for using those powers; the economic and social implications they carry; and the circumstances justifying their exercise. The distinction between recognizing environmental regulation as an exercise of the state police power, and thus non compensable, or as an exercise of the state eminent domain power and compensable should depend on a test that integrates both ex-ante and ex-post examination. Such examination should consider the circumstances that led to government interference with private property, along with the justifications and urgency for such interference to determine what power the government exercised in each case. While a place should be preserved for ex-post examination of a regulation's results, courts should default to the ex-ante test when determining which power the government should exercise and what compensation it owes the property owner. This integrated examination would allow the government to act consciously on the implications of the regulation on the one hand while estimating these implications on the other.

V. THE FOUR CHARACTERISTICS UNIQUE TO ENVIRONMENTAL REGULATION

When choosing which power to exercise, governments must internalize costs, and consider the urgency and social implications those choices may have. While this is true for any government regulation, environmental regulation requires heightened consideration. Environmental threats vary in nature and magnitude. Concerns include: greenhouse gases; preserving wetlands; water, soil, and air pollution; rising sea levels; radiation intensities; forest conservation; renewable energies; plastic bags; water scarcity; forest deforestation; contaminated properties; and preservation of endangered species. In some cases, the risk is clear and immediate, while in other cases the risk is uncertain and cumulative.[104] Risks can affect a defined geographical area, but are frequently broad and cross geographic (as well as national) borders.[105] Repelling and reducing environmental threats requires governments to

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[104] *See, e.g.*, Howard Kunreuther et al., *Integrated Risk and Uncertainty Assessment of Climate Change Response Policies*, *in* CLIMATE CHANGE 2014 MITIGATION OF CLIMATE CHANGE: WORKING GROUP III CONTRIBUTION TO THE FIFTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 157–58 (2014) (grouping uncertainties into five groups: climate responses to greenhouse gas emissions; stocks and flows of carbon and other greenhouse gasses; technological systems; market behavior and regulatory actions; and individual and firm perceptions).

[105] Mark A. Titley et al., *Global Inequities and Political Borders Challenge Nature Conservation Under Climate Change*, 118 PROC. NAT'L ACAD. SCIS., Feb. 8, 2021, at 1.

consider the diverse characteristics of the threats and respond in a variety of ways, sometimes simultaneously. Dealing with environmental challenges and threats imposes a wide range of economic, social, and—no less important—legal considerations on authorities. The consequences of environmental regulation may defy point-by-point confrontation and require actions that transcend the boundaries of local communities, states, and even continents. In dealing with environmental challenges, governments often operate without scientific certainty, making it difficult to estimate risk, magnitude, and reversibility. Therefore, environmental regulation maintains unique characteristics that challenge the action of governments and their ability to assimilate the full range of economic, social, and legal considerations into their action. Any regulatory framework or attempt to provide a roadmap to government choice of power (and to owners' entitlement to compensation) should begin by acknowledging these distinct characteristics and their effect on governments' ability to cope with environmental threats. This Part of the Article identifies these characteristics and provides a basis for creating a normative framework for government action addressing environmental challenges. In this Part, I will focus on four characteristics unique to environmental regulation: urgency, uncertainty, irreversibility, and cross-border damage. Although these characteristics do not describe all aspects of environmental regulation, they distinguish it from non-environmental regulation. The choice to focus on these characteristics is to illustrate how they affect the government's choice of mechanism for dealing with environmental threats and demonstrates how they affect, or should affect, the extent of property owners' entitlement to compensation for harm caused by regulation.

A. Empirical and Scientific Certainty of Risk

The evidence regarding environmental risks is constantly accumulating.[106] For some risks, both the expectation of damage and the feasibility of their realization are scientifically confirmed. Other risks are considered "emerging risks," meaning either the expectation of damage or likelihood of realization—or both—are unknown or cannot currently be identified.[107] For example, one large uncertainty is the rate and magnitude of sea-level rise. According to one study, by 2100 the rate of mean sea-level rise may vary from 0.26 meters to 0.98 meters.[108] Other

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[106] *See, e.g.*, David Dodman et al., *Cities, Settlements and Key Infrastructure*, *in* IPCC 2022: Sixth Assessment, *supra* note 18, at 973 (discussing increase in literature on the "intensify[ing] financial and environmental risks" that low-income, communities of color face and adoption measures currently being taken).

[107] *See, e.g.*, Mark New et al., *Decision-Making Options for Managing Risk*, *in* IPCC 2022: Sixth Assessment, *supra* note 18, at 2601 (defining emerging risks as "conditions not previously or widely experienced but not increasingly present").

[108] Marjolijn Haasnoot et al., *Generic Adaptation Pathways for Coastal Archetypes under Uncertain Sea-Level Rise*, ENV'T RSCH. COMMC'N, No. 017006, Aug. 2019, at 1 (internal citation omitted).

studies suggest that even if emissions are reduced according to the Paris Agreement, sea levels will continue to rise, even though the rate and magnitude of the risk and its impact are uncertain.[109] An additional example regarding the uncertainty about the rate and magnitude of emerging environmental risks is human exposure to certain toxic chemicals such as TCE, a carcinogenic degreasing solvent used in many industries and a contaminant in water, air, and soil.[110] Specifically, the rate and magnitude of TCE's impact is unknown because the level of a person's exposure and whether a person develops cancer in the future is unknown.[111] While studies suggest a link between TCE exposure and cancer, there remains a degree of scientific uncertainty regarding whether these associations are causal or not.[112]

In addition to uncertainty about the rate and magnitude of emerging environmental risks, the impacts of some techniques and instruments considered as responses to environmental threats also cause uncertainty. One prominent example is Solar Radiation Modification (SRM). SRM aims to address a symptom of climate change—the Earth's rising temperature—by reflecting more sunlight back into space or by allowing more infrared radiation to escape.[113] There are numerous proposed methods that differ significantly.[114] Yet, as research reveals, SRM technologies could cause environmental harm by affecting stratospheric ozone levels and elevating levels of acid rain.[115]

The uncertainty that characterizes environmental threats make them particularly complex to regulate.[116] In general, a regulation that infringes on private property, as in the *Sackett* case, or one that seeks to regulate social behavior, requires scientific proof in addition to security and safety information that justify state intervention. Consider, for example, public health regulations due to the Covid-19 pandemic. The instruction to wear face masks in enclosed spaces was based on scientific information about how the virus was transmitted, and the ability of these masks to prevent infection.[117] Without a scientific basis, such a directive

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109 *Id.*

110 INST. MED., ENVIRONMENTAL DECISIONS IN THE FACE OF UNCERTAINTY 54 (2013).

111 *Id.*

112 *Id.*

113 Neil Craik, *Solar Radiation Modification and Loss Damage: Mapping Interactions between Climate Responses*, *in* RESEARCH HANDBOOK ON CLIMATE CHANGE LAW AND LOSS & DAMAGE 287, 288 (Meinhard Doelle & Sara L. Seck eds., 2021).

114 NAT'L RSCH. COUNCIL ET AL., CLIMATE INTERVENTION: REFLECTING SUNLIGHT TO COOL EARTH 32 (2015) (listing different methods, "including injecting aerosols into the stratosphere, marine cloud brightening, and other efforts to enhance surface reflectivity").

115 *Id.* at 85, 95. Other SRM technologies "may impact marine ecosystems as a result of reductions in the amount of direct sunlight in areas subject to cloud seeding." *See* Craik, *supra* note 113, at 292.

116 Martin Weitzman, *Structural Uncertainty and the Value of Statistical Life in the Economics of Catastrophic Climate Change*, 24 (Nat'l Bureau of Econ. Rsch., Working Paper No. 13490, 2007).

117 *See, e.g.*, Requirement for Persons to Wear Masks While on Conveyances and at Transportation Hubs, 86 Fed. Reg. 8,026, 8,028 (Feb. 3, 2021).

would have been puzzling. The same is true for safety regulation. The Occupational Safety and Health Act of 1970 (OSHA)[118] ensures that employers provide employees with an environment free from recognized hazards such as exposure to toxic chemicals, excessive noise levels, mechanical dangers, heat or cold stress, and unsanitary conditions.[119] The basis for this regulation was clear: in the two years preceding OSHA's enactment, 14,000 workers died each year from workplace hazards and another two million were disabled or harmed.[120] Regulations usually adopts a "wait and learn," approach that is usually conducted in a data-based manner.[121] Environmental regulations, however, created a fundamentally different approach.[122]

The United Nations Framework Convention on Climate Change from 1992 states: "The Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects . . . lack of full scientific certainty should not be used as a reason for postponing such measures."[123] A similar instruction was included in the Rio Declaration of that year, which stated: "[I]n order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities . . . lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."[124] These guidelines for taking regulatory action *before* a scientific basis exists call on decision-makers and regulators not to wait but to act immediately and learn while acting. Adopting the concept of "act and learn" in environmental regulation demonstrates its difference from regulation in other areas. This approach allows for quick regulatory action on the one hand but undermines the legitimacy of such regulation on the other. Acting with uncertainty and a lack of full scientific confirmation of the threat, its magnitude, and ways of dealing with it—although sometimes, understandably, due to unique characteristics of the threat and its possible irreversibility as detailed below[125]—reduces the legitimacy of regulations to infringe on property rights and interfere with traditional

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118 29 U.S.C. §§ 651–678 (2018).

119 U.S. OCCUPATIONAL SAFETY & HEALTH ADMIN. (OSHA), RECOMMENDED PRACTICES FOR SAFETY AND HEALTH PROGRAMS 17–18 (2016).

120 John H. Stender, *Enforcing the Occupational Safety and Health Act of 1970: The Federal Government as a Catalyst*, 38 L. & CONTEMP. PROBS. 641, 641–43 (1974).

121 Cass R. Sunstein, *Irreversibility*, 9 L. PROB. & RISK 227, 229 (2010).

122 *See id.* ("Within the federal courts, a special precautionary principle underlies the analysis . . . involving a risk of irreparable environmental harms.") (internal citation omitted).

123 The United Nations Framework Convention on Climate Change art. 3, May 9, 1992, 1771 U.N.T.S. 107 [hereinafter UNFCCC articles].

124 G.A. Res. 151/26, annex 1, Rio Declaration on Environment and Development (Aug. 12, 1992).

125 *See infra* Part V.B.

ways of life.[126] As international conventions make clear, environmental challenges will not wait until full scientific clarification of the threats and damages' full extent are known.[127] Under local, national, and international responsibilities, governments cannot wait either. At the same time, the environment of scientific uncertainty, and the social and proprietary implications of environmental regulation, require governments to do as much calculated and measured action as possible. This scientific uncertainty nourishes another unique feature of environmental regulation: the fear of irreversibility.

B. The Irreversibility of the Damage

One of the prominent arguments for addressing environmental risks despite their uncertain timing, magnitude, and likelihood of loss, is their irreversible nature. Irreversibility plays a significant factor in environmentalists' arguments against, for example, clear-cutting of climax forests, as the original tree biodiversity is not expected to fully recover.[128] Another instance in which irreversibility plays a significant role is global warming. According to the Intergovernmental Panel on Climate Change (IPCC) 2022 special report, even if the world manages to limit global warming to 1.5ºC, some long-term impacts of warming will likely be inevitable and irreversible.[129] These long-term impacts include sea level rises,[130] the melting of Arctic ice,[131] and the warming and acidification of the oceans.[132] Furthermore, irreversibility plays a significant role in the extinction or near-extinction of endangered species. Specifically, once a certain species becomes extinct or there is a significant threat of extinction, it can irreversibly affect the environment through, for example, prompting cascading effects through the food chain

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[126] *See, e.g.*, Rebecca Tsosie, *Indigenous People and Environmental Justice: The Impact of Climate Change*, 78 U. COLO. L. REV. 1625, 1628, 1674–75 (2007) (arguing "for a right to environmental self-determination for [I]ndigenous peoples, which would allow them to maintain their unique cultural and political status"); Jorge E. Vinuales, *Legal Techniques for Dealing with Scientific Uncertainty in Environmental Law*, 43 VAND. J. TRANSNAT'L L. 437, 438–39 (2010) (explaining how economic hostility and scientific uncertainty have been relied upon to downplay the legitimacy of environmental regulation and suggests using legal techniques grounded in international environmental law to address these challenges).

[127] *See* UNFCCC articles, *supra* note 123 (explicitly stating that parties to the Convention should take precautionary measures to prevent environmental harm and lack of full scientific certainty should not be a reason for postponing action).

[128] H.J. Albers & M.J. Goldbach, *Irreversible Ecosystem Change, Species Competition, and Shifting Cultivation*, 22 RES. & ENERGY ECON. 261, 262–63 (July 2000); Han Xu et al., *Partial Recovery of a Tropical Rain Forest a Half-Century After Clear-Cut and Selective Logging*, 52 J. APPLIED ECOLOGY 1044, 1045, 1050 (2015).

[129] Ove Hoegh-Guldberg et al., *Impacts of 1.5ºC of Global Warming on Natural and Human Systems*, *in* GLOBAL WARMING OF 1.5°C: AN IPCC SPECIAL REPORT 177 (Valérie Masson-Delmotte et al. eds., 2022).

[130] *Id.* at 178, 206.

[131] *Id.* at 205.

[132] *Id.* at 209–10.

and permanently impacting other species and the entire ecosystem.[133] An oft-cited example of the irreversible effects of near extinction is the impact due to the near loss of the wolf population to the rest of the ecosystem in Yellowstone National Park.[134] The wolves were hunted to near-extinction by 1930.[135] Without the wolf population, the deer and elk they had preyed upon began to thrive, resulting in the decimation of streamside willows and aspens—the habitat for songbirds.[136] Without these trees, the stream banks began to erode.[137] The songbird population declined due to its habitat loss, allowing mosquitoes and other insects that the birds would have eaten to multiply.[138]

A significant part of the growing concern among decision-makers and the public regarding environmental challenges stems from the recognition that environmental damages carry potentially irreversible consequences, which will affect not only current generations but future generations as well.[139]

Irreversibility, as Professor Cass Sunstein suggests, has two different meanings. The first is what Sunstein calls "option value," which means when information is incomplete, decision-makers sometimes prefer being (overly) cautious to preserve flexibility for when knowledge increases.[140] The "option value" meaning of irreversibility assumes that when regulators are dealing with uncertain loss which has the potential to be disastrous, expensive, and irreversible, they prefer a conservative

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[133] *See infra* notes 134–138 and accompanying text (describing such cascading effects resulting from the near extinction of wolves in Yellowstone National Park).

[134] Renee Cho, *Why Endangered Species Matter*, COLUM. CLIMATE SCH. (Mar. 26, 2019), https://perma.cc/UA43-XKHW; *see also* Douglas W. Smith & Edward E. Bangs, *Reintroduction of Wolves to Yellowstone National Park: History, Values and Ecosystem Restoration*, *in* REINTRODUCTION OF TOP-ORDER PREDATORS 92, 92–93 (Matt W. Hayward & Michael J. Somers eds., 2009) (providing the history of wolf eradication and repopulation in Yellowstone).

[135] Cho, *supra* note 134.

[136] *Id.*

[137] *Id.*

[138] *Id.*

[139] *See* Kenneth J. Arrow & Anthony C. Fisher, *Environmental Preservation, Uncertainty, and Irreversibility*, 88 Q.J. ECON. 312, 314 (1974) (describing the effect on the policy decision between preservation and development when irreversible environmental damage is at risk); Graciela Chichilnisky & Geoffrey Heal, *Global Environmental Risks*, 7 J. ECON. PERSPS., Fall 1993, at 76–77 (discussing the connection between the threat of irreversibility and the concept of "option value").

[140] Sunstein, *supra* note 121, at 231 ("[S]ome people are also willing to pay for the 'option' to use or to benefit from an environmental amenity in the future, even if they are unsure whether they will exercise that option at any time.") (internal citation omitted); Arrow & Fisher, *supra* note 139, at 319 ("Essentially, the point is that the expected benefits of an irreversible decision should be adjusted to reflect the loss of options it entails.") (internal citation omitted); *see also* Chichilnisky & Heal, *supra* note 139, at 77 ("The central issue is that benefits will accrue in the future from the preservation of a resource, but these are currently unknown. If the resource is preserved into the future, then in the future the decision about whether to preserve it can be reconsidered in the light of better information then available about the benefits from its existence. If it is not preserved, then there is no chance of reconsideration when we have better information. In this case conventional decision rules will underestimate the value of preserving the asset.").

approach for maintaining their flexibility in the future.[141] This approach is often defined as the Irreversible Harm Precautionary Principle, which is based on regulators' and decision-makers' willingness to preserve their options.[142]

The second meaning of irreversibility is different in nature;[143] according to Sunstein, irreversibility refers to cases where an environmental threat may result in damage that is not economically repairable.[144] As Sunstein explains: "When people object to the loss of a species or a beach, and contend that the loss is irreversible, they mean to point to its permanence and to the fact that what has been lost is not valued in the same way or along the same metric as money."[145] Thus, under the first meaning of irreversibility, decision-makers tend to act quickly, before scientifically establishing the threat to buy time for future decisions; however, under the second meaning, avoiding action now leads to complete loss of a particular resource or species.

Irreversibility plays a significant role in environmental regulation. The Court in *Amoco Production Co. v. Village of Gambell*[146] recognized the irreversible character of environmental threats.[147] Based on this recognition, courts often consider the potential of "irreparable environmental harm" when determining whether to grant preliminary injunctions.[148] While the Court in *Winter v. Natural Resources Defense Council, Inc.*[149] denied a presumption of irreparable environmental harm in *every* environmental case,[150] it held that when plaintiffs demonstrate the likelihood of an irreparable environmental injury, the court will grant

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141 Sunstein, *supra* note 121, at 233.

142 Jonathan Remy Nash, *Standing and the Precautionary Principle*, 108 COLUM. L. REV. 494, 503–04 (2008) ("Put economically, regulation in the face of serious irreversible costs is equivalent to purchasing an option to preserve the opportunity to take steps to avoid the irreversible harm in the future.") (internal citation omitted).

143 Sunstein, *supra* note 121, at 230 (noting that the second conception "emphasizes losses of goods that are incommensurable . . . in the sense that they are qualitatively distinctive and in some cases unique").

144 *Id.* at 237.

145 *Id.*

146 480 U.S. 531 (1987).

147 *Id.* at 545 ("Environmental injury, by its nature, can seldom be adequately remedied by money damages and is often permanent or at least of long duration, *i.e.*, irreparable.").

148 *See, e.g.*, Ctr. for Food Safety v. Vilsack, 753 F. Supp. 2d 1051, 1060 (N.D. Cal. 2010) (weighing "the potential irreparable damage to the environment established by Plaintiffs" to the economic harm faced by defendants when determining if a preliminary injunction should be granted), *vacated*, 636 F.3d 1166 (9th Cir. 2011); Sierra Club v. U.S. Forest Serv., 593 F. Supp. 2d 1306, 1324, 1327 (N.D. Ga. 2008) (requiring the plaintiffs to "make a showing of the likelihood of irreparable harm to the environment[]" in order to get a preliminary injunction).

149 555 U.S. 7 (2008).

150 *See id.* at 23 (explaining how because the activity in question was not unknown or new to the area, there could not be a presumption of irreparable harm resulting from a purely procedural violation of NEPA); *see also Sierra Club*, 593 F. Supp. 2d at 1323 ("While Plaintiffs argue that a violation of NEPA leads to a presumption of irreparable harm, there is no presumption entitling plaintiffs to automatic injunctive relief merely because there has been a NEPA violation.") (internal citation omitted).

a preliminary injunction.[151] Irrevocability, therefore, serves as a justification for government action to prevent the realization of environmental threats. However, as the Court has ruled, irreversible environmental damage should not become a presumption in *every* environmental challenge, and the Court does not assume irreversibility without a showing of supporting information.[152] The requirement that irreversibility be proven, at least at the level of likeliness, becomes a significant challenge for plaintiffs in an area of scientific uncertainty. The dependence on these two characteristics—uncertainty and irreversibility—makes environmental regulations particularly challenging. The concern of irreversibility that characterizes environmental regulation, like scientific uncertainty, requires governments to act more prudently while internalizing the economic and social consequences of the regulation. When decision-makers regulate to preserve their options, they should consider the costs and effects of their actions more carefully. This is true not only because these decision-makers should be aware of the entire cost-benefit scheme of their actions, but also because individuals should not bear the costs of these options alone. Environmental regulations, which includes the irreversibility of damage as part of its set of considerations, should give this characteristic weight in everything related to its impact on private property.

C. Cross-Border Damages

Another characteristic of environmental regulations is the potential distance between the place where the restrictions are imposed and the place where the damage is expected to occur. As mentioned, environmental threats are different and varied. Some carry a global character, while others are local. For example, the threats of global warming or rising sea levels are global in two ways: (1) the realization of these threats crosses local and national boundaries;[153] and (2) perhaps more important for this Article, where the damage will occur does not depend on the location of the environmental violation.[154] For example, global warming may mainly affect Global South countries, while most of the environmental violations are attributed to Global North countries.[155]

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151 *Winter*, 555 U.S. at 23; *Sierra Club*, 593 F. Supp. 2d at 1324.

152 *Winter*, 555 U.S. at 22.

153 Timothy R. Carter et al., *A Conceptual Framework for Cross-border Impacts of Climate Change*, 69 GLOB. ENV'T CHANGE, May 2021, at 4.

154 *Id.* at 5 (suggesting that one prominent characteristic of environmental threats is what they term "*External impact; local transmission*: where the initial impact occurs in a jurisdiction external to the recipient risk, whereas all subsequent impacts are transmitted within the same, 'local' jurisdiction as the recipient risk") (emphasis in original).

155 A. S. Wijaya, *Climate Change, Global Warming and Global Inequity in Developed and Developing Countries (Analytical Perspective, Issue, Problem and Solution)*, 19 IOP CONF. SERIES: EARTH & ENV'T. SCI., Mar. 2014, at 4; Paul Chinowsky et al., *Climate Change: Comparative Impact on Developing and Developed Countries*, 1 ENG'G PROJECT ORG. J. 67, 77 (2011).

In the same way, sea-level rise is likely to be most destructive for island or coastal states,[156] while the environmental violations that amplify this threat are not actually committed in these countries.

The distance between the place where the threat will materialize and where the environmental violation is committed makes it difficult to mitigate the environmental challenges and requires international cooperation. The international community has established several principles for this purpose. For example, the "no-harm" principle dictates how states must ensure that activities within their jurisdiction do not cause significant cross-boundary environmental damage and constitutes the cornerstone of international environmental law.[157] Another principle designed to consider the differences between countries, their economic capabilities, and their level of development is the principle of "Common But Differentiated Responsibilities" (CBDR), which establishes that all states are responsible for addressing global environmental destruction but they are not equally responsible.[158] These principles raise many questions regarding the responsibility of states to one another and the ability of the international community to enforce these principles.[159] However, they also express recognition of the distance between places where environmental violations are committed and the places that will eventually bear the burden of these environmental threats.

The commitment of states to ensure that activities within their jurisdiction do not cause significant cross-boundary environmental damage raises questions both at the level of international environmental law and at the level of domestic and local regulation. Regulation of land uses to accommodate environmental threats beyond the borders of the community, county, state, or even the continent raises the question of

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156 JAMES E. NEUMANN ET AL., SEA-LEVEL RISE & GLOBAL CLIMATE CHANGE: A REVIEW OF IMPACTS TO U.S. COASTS 23 (2000).

157 *See* Barbara Kwiatowska, *Fundamental Principle of "Without Prejudice" in Submissions to the United Nations Commission on the Limits of the Continental Shelf (UNCLCS) in East, South, West and North Africa*, *in* GLOB. Y.B., *supra* note 23, at 152 ("International law does not allow states to conduct or permit activities within their territories, or in common spaces, without regard for the rights of other states or for the protection of the global environment.").

158 *Id.*; *see also* Christopher D. Stone, *Common but Differentiated Responsibilities in International Law*, 98 AM. J. INT'L L. 276, 277 (2004) ("Responsibilities are said to be 'differentiated,' . . . in that not all countries should contribute equally.").

159 *See, e.g.*, Mayer, *supra* note 22, at 79–80 ("[T]he no-harm principle has rarely been explicitly invoked in international responses to climate change. Instead of developing the no-harm principle, the climate regime has largely built upon an ambivalent 'principle' of common but differentiated responsibilities (CBDRs). Yet, recognizing that states have common but differentiated responsibilities '[i]n view of the different contributions to global environmental degradation' says little about the ground for differentiation or the nature of the responsibility – either the causal responsibility arising from a wrongful act or the moral responsibility of those capable of helping the needy . . . Altogether, the CBDRs principle offers insufficient guidance to international negotiations on climate change; its ambiguity has contributed to the stalemate of climate change negotiations over the last two decades.") (internal citations omitted).

whether local property owners should bear the economic and distributive consequences of the regulation.

The debate over the obligations of property owners towards others has occupied the property discourse for centuries.[160] Most liberal and communitarian literature regarding property rights recognizes that landowners are not an "island" and that their property rights also produce obligations to the community.[161] At the same time, the scope of this obligation is affected by the source from which it arises. Liberal conceptions of property imply the owner's obligation to others on others' rights and autonomy,[162] while communitarian conceptions impose this

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160 *See, e.g.*, James Charles Smith, *Some Preliminary Thoughts on the Law of Neighbors*, 39 GA. J. INT'L & COMP. L. 757 (2011) (discussing the "mainstays" of laws that govern real property and interacts between owners of neighboring parcels); *see also* David Ezra, *Get Your Ashes Out of My Living Room: Controlling Tobacco Smoke in Multi-Unit Residential Housing*, 54 RUTGERS L. REV. 135, 268–72 (2001) (discussing how nuisance law can be used to approach the public health effect of cigarette use).

161 *See, e.g.*, Gregory S. Alexander, *The Social-Obligation Norm in American Property Law*, 94 CORNELL L. REV. 745, 747 (2009) ("[P]roperty owners owe far more responsibilities to others, both owners and non-owners, than the conventional imagery of property rights suggests.") (internal citation omitted); JEDEDIAH PURDY, THE MEANING OF PROPERTY: FREEDOM, COMMUNITY, AND THE LEGAL IMAGINATION 3–4 (2010) (suggesting that even Blackstone conceived property ownership as an institution that includes duties to neighbors); Laura S. Underkuffler, *On Property: An Essay*, 100 YALE L.J. 127, 147 (1990) ("The comprehensive approach recognizes the individual's need to develop the capacities of self in the context of relatedness to others; it stresses that individual autonomy and social context are in fact deeply intertwined. By viewing a collective context as necessary for the definition and exercise of individual rights, the comprehensive approach to property forces us to rethink the relationship between the community and individual rights."); Joseph William Singer, *The Ownership Society and Takings of Property: Castles, Investments, and Just Obligations*, 30 HARV. ENV'T L. REV. 309, 332 (2006) ("Owners do not live alone and when their exercise of property rights affects others, the interests of those others need to be taken into account to determine whether any obligation imposed on a property owner is just or fair.") (internal citation omitted); Hanoch Dagan, *Pluralism and Perfectionism in Private Law*, 112 COLUM. L. REV. 1409, 1416 (2012) ("Property can be understood as an exclusive right, and exclusion or exclusivity can exhaust the meaning of property and thus be properly described as its core, only if we set aside somewhat arbitrarily large parts of what constitutes property law, at least according to the conventional understanding found in the case law, the Restatements, and the academic commentary. Indeed, many property rules that prescribe the rights and obligations of members of local communities, neighbors, co-owners, partners, and family members, including rights regarding the governance of these property institutions, cannot be analyzed fairly through terms of exclusion.").

162 *See, e.g.*, Dagan, *supra* note 161, at 1416–17 ("In certain circumstances, the right of nonowners to be included and exercise a right to entry is even typical of property . . . . [T]his claim applies also to individualistic justifications, such as autonomy. As a general right-based justification of property, the idea that personal autonomy requires individual property rights entails significant distributive implications. Justifying law's enforcement of the rights of those who have property by reference to the role of property in serving people's autonomy (rather than to a specific event or attribute of property owners) necessarily implies that every human being is entitled to some property."); HANOCH DAGAN, A LIBERAL THEORY OF PROPERTY 72–73 (2021) ("These vertical duties [obligations to nonowners] are 'inherent in what it means to own property,' because they are entailed by the same normative commitments that underlie property to begin with.") (internal citation omitted).

liability on their belonging and commitment to their community.[163] However, all conceptions of property suggest that the scope of the property owners' obligations to others depends on proximity.[164] Thus, there is significance to the purpose for which the restrictions were imposed, and—no less important—whom these restrictions are intended to serve. In essence, property literature suggests that landowners owe greater obligations to their community than to anyone else.[165] Although this common assumption does not exempt property owners from *any* obligation toward society at large, these "general" obligations are usually limited and require society to compensate the owners for their loses.[166] This distinction affects landowners' entitlement to compensation for harm caused to their property by environmental regulations. Accordingly, to the extent that the regulation aims to tackle environmental risk that threatens to materialize within the borders of the owners' community, the owners' responsibility to ward off the threat is greater than in cases where the environmental threat is expected to materialize in another locality, state, or continent. Most environmental regulations, including ones that aim to tackle cross-border environmental threats, are considered only in liability rules terms, not in property rules terms.[167] International

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[163] *See, e.g.*, Gregory S. Alexander & Eduardo M. Peñalver, *Properties of Community*, 10 THEORETICAL INQUIRIES L. 127, 137 (2009) ("Social structures, including distributions of property rights and the definition of the rights that go along with the ownership of property, are to be judged, at least in part, by the degree to which they foster the participation by human beings in these objectively valuable patterns of existence and interaction.").

[164] *See, e.g.*, Hanoch Dagan & Avihay Dorfman, *Just Relationships*, 116 COLUM. L. REV. 1395, 1423 (2016) ("The duty of accommodation is not an all-encompassing requirement to accommodate each and every person in each and every area of their practical affairs. Rather, the duty typically establishes fair terms of interaction in and around one sphere of action; it applies to a particular context or event and with respect to one person (or class of persons) at a time."); Avihay Dorfman, *The Normativity of the Private Ownership Form*, 75 MOD. L. REV. 981, 993 (2012) ("[A]ny group of persons living in proximity to one another, and thereby seeking to arrange their practical affairs systematically in a peaceful manner, must create a scheme of property coordination."); Amnon Lehavi, *How Property Can Create, Maintain, or Destroy Community*, 10 THEORETICAL INQUIRIES L. 43, 61 (2009) ("Property law constitutes the formal regime which sets out the ways in which society allocates, governs, and protects entitlements and obligations in resources and human relationships around them.").

[165] *See, e.g.*, Joseph William Singer, *The Reliance Interest in Property*, 40 STAN. L. REV. 611, 653–54 (1988) (arguing that our social relationships should be considered as comprising a spectrum—from relations among strangers, to relations among neighbors, to continuing relations in the market, to intimate relations in the family—and that each of these relationships gives rise to a different conception of the right to property).

[166] *See* Hanoch Dagan, *Takings and Distributive Justice*, 85 VA. L. REV. 741, 742 (1999) (noting that takings jurisprudence aims to compensate those the government forces to bear public burdens that, in the interests of fairness and justice, should be borne by society as a whole).

[167] *See* Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089, 1123–24 (1972) (discussing the role that liability and inalienability rules play in environmental regulations, specifically ones aimed at addressing pollution problems); *see also* Institute de Droit International, *Responsibility and Liability for Environmental Damage Under International Law* (1997),

environmental law supports the liability rules framework, as it requires states to regulate private property within their jurisdictions to prevent damage to other jurisdictions.[168] Acting within a liability rules framework provides that landowners' varied levels of obligations and liabilities toward others is reflected in their entitlement to compensation.[169] Accordingly, as landowners' liability toward their community is greater than toward other communities and localities, their entitlement to compensation due to regulations that infringe upon their property rights should reflect these differences. Aiming to establish a general rule for this distinction suggests that if a regulation affecting private property intends to accommodate a global threat, the owner's entitlement to compensation will be high, whereas if the threat a regulation intends to deal with is local, this entitlement may decrease.

D. Urgencies and Emergencies

Dealing with environmental threats is, justly, perceived as urgent. The latest environmental reports raise concerns that, without urgent action by states and local communities, the ability to deal with environmental threats such as global warming, sea-level rise, water and air quality will be impossible.[170] As noted by the 2022 IPCC report's chapter entitled "Point of Departure and Key Concepts," "[c]limate change adaptation is . . . urgent to the extent that meeting important societal goals requires *immediate* and long-term action by governments, business, civil society and individuals at a scale and speed significantly faster than that represented by current trends."[171]

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https://perma.cc/RL2L-8EYN (discussing how obligations under international environmental laws "provide for strict responsibility on the basis of harm or injury alone"). For an analysis of this resolution, see Teresa A. Berwick, *Responsibility and Liability for Environmental Damage: A Roadmap for International Environmental Regimes 1998 Focus Issue: Resolution on Responsibility and Liability*, 10 GEO. INT'L ENV'T L. REV. 257 (1997).

168 Daniel W. Bromley, *Property Rules, Liability Rules, and Environmental Economics*, 12 J. ECON. ISSUES, 43, 49 (1978) (explaining that the liability rule is at play when a person may stop another from interfering with their property, but must compensate that other person); Max Valverde Soto, *General Principles of International Environmental Law*, 3 J. INT'L & COMP. L. 193, 203 (1996) (explaining that there are several bases for international responsibility in environmental law, and that strict liability is difficult to impute for activities that are not ultra-hazardous).

169 Bromley, *supra* note 168, at 49–52.

170 *See, e.g.*, Richard Falk, *The Second Cycle of Ecological Urgency: an Environmental Justice Perspective*, *in* ENVIRONMENTAL LAW AND JUSTICE IN CONTEXT 39 (Jonas Ebbesson & Phoebe N. Okowa eds., 2009) ("There has for several years existed a growing consensus among experts that a circumstance of ecological urgency on a global scale exists. What is new and potentially hopeful, is the rapidly increasing public acceptance of the reality of this urgency."); Petteri Taalas & Inger Andersen, *Forward*, *in* CLIMATE CHANGE 2021: THE PHYSICAL SCIENCE BASIS: WORKING GROUP I CONTRIBUTION TO THE SIXTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (Valérie Masson-Delmotte et al eds., 2021); WORLD METEOROLOGICAL ORG., STATE OF THE GLOBAL CLIMATE 2020 34 (2021), https://perma.cc/FPU7-9ZHQ.

171 Ali et al., *supra* note 25, at 178 (emphasis added).

At the same time, it is worth distinguishing between two meanings of urgency. One sense of urgency is the need to take action to prevent immediate harm. Consider, for example, a situation where a government is required to take action to prevent an ecological disaster such as hazardous emissions, extensive groundwater contamination, floods, or an accident that causes peripheral environmental damage. In such situations, the government is required to take prompt and immediate steps to reduce environmental damage. Similarly, there are situations in which the government seeks to regulate specific land uses that cause ongoing environmental damage. Consider, for example, the thirty-two-month moratorium on development in the Lake Tahoe Basin imposed by the Tahoe Regional Planning Agency in the 1980s, which was designed to allow formulation of a comprehensive land-use plan for the area and prevent further environmental damage to the lake.[172] These moratoria, and their implications on owners, were put to the test in *Tahoe-Sierra Preservation Council, Inc. v. Tahoe Regional Planning Agency* (*Tahoe-Sierra*).[173] Authorities in *Tahoe-Sierra* realized that continued construction around the lake threatened the lake's exceptional clarity and unique ecological system, due to the flow of nitrogen and phosphorous that nourished the growth of algae.[174] The ban on further development and construction around the lake was intended to prevent immediate damage.[175] In such cases, the authorities must act urgently to ward off an immediate environmental threat because any delay could result in the immediate realization of the threat.

Yet there is a second sense of urgency, which deals with the need to take action to prevent long-term or future damage. In such cases, the authorities must act now to prevent future damage. One prominent example of urgent threats of the second type is global warming. Scientists suggest that global warming is responsible for widespread, pervasive impacts on ecosystems, people, territories, and infrastructure.[176] These impacts have caused an observed increases in the frequency and intensity of climate, and weather extremes including hot extremes on land and the ocean, heavy precipitation, drought, and fire.[177] Climate change has caused substantial damages and increasingly irreversible losses in terrestrial, freshwater, coastal, and open ocean marine ecosystems.[178]

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172 Tahoe-Sierra Pres. Council, Inc. v. Tahoe Reg'l Plan. Agency, 535 U.S. 302, 304 (2002).

173 *Id.*

174 *Id.* at 307.

175 *Id.* at 308.

176 Pörtner et al., *supra* note 18, at 9.

177 Cherif Diop et al., *Climate Change: New Dimensions in Disaster Risk, Exposure, Vulnerability, and Resilience*, *in* SPECIAL REPORT TO THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE: MANAGING THE RISKS OF EXTREME EVENTS AND DISASTERS TO ADVANCE CLIMATE CHANGE ADAPTION 27–29 (Christopher B. Field et al. eds., 2012).

178 H.P. Jarvie et al., *Climate Change and Coupling of Macronutrient Cycles Along the Atmospheric, Terrestrial, Freshwater and Estuarine Continuum*, 434 SCI. TOTAL ENV'T, Sept. 15, 2012, at 252–55.

Climate change has reduced food and water security, hindering efforts to meet sustainable development goals.[179]

Research suggests that global surface temperature will exceed 1.5°C in the coming decades; many human and natural systems will face additional severe risks if global warming is not held below 1.5°C.[180] Nevertheless, scientists distinguish between actions that need to be taken to avoid immediate damage and those that might prevent long-term damage. For example, immediate inland flooding threats can be addressed by establishing early warning systems,[181] enhancing natural water retention (such as restoring wetlands and rivers),[182] land use planning and regulation (such as no-build zones),[183] or upstream forest management.[184] However, these measures may not be sufficient enough (and in some cases, might even interfere) to adapt to long-term environmental risks.[185] Finding temporary solutions or solutions to a particular sector may prevent immediate damage. However, as long as there are no integrated solutions, such as addressing the range of threats in the various sectors, global warming will continue and may even increase.[186] This increase will pose more significant environmental

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[179] *See* Ali et al., *supra* note 25, at 144 ("The key risk assessment conveys increasing urgency given the growing visibility of climate change impacts in the current world. Representative key risks emerging across sectors and regions include risks to coastal socio-ecological systems and terrestrial and ocean ecosystems; risks associated with critical infrastructure, networks, and services; risks to living standards and human health; risks to food and water security; and risks to peace and migration.").

[180] Pörtner et al., *supra* note 18, at 8 ("WGI assessed increase in global surface temperature is 1.09 [0.95 to 1.20] °C in 2011–2020 above 1850–1900. The estimated increase in global surface temperature since AR5 is principally due to further warming since 2003–2012 (+0.19 [0.16 to 0.22] °C). Considering all five illustrative scenarios assessed by WGI, there is at least a greater than 50% likelihood that global warming will reach or exceed 1.5°C in the near-term, even for the very low greenhouse gas emissions scenario.") (internal citation omitted).

[181] Annegret H. Thieken et al., *Compound Inland Flood Events: Different Pathways, Different Impacts and Different Coping Option*s, 22 NAT. HAZARDS EARTH SYS. SCIS. 165, 174 (2022); Reid Basher, *Global Early Warning Systems for Natural Hazards: Systematic and People-centred*, 364 PHIL. TRANS. R. SOC. A. 2167, 2168–70 (2006).

[182] William J. Mitsch & Maria E. Hernandez, *Landscape and Climate Change Threats to Wetlands of North and Central America*, 75 AQUATIC SCI. 133, 146–47 (2013).

[183] Howard Wheater & Edward Evans, *Land Use, Water Management and Future Flood Risk*, 26 LAND USE POL'Y S251, S259–60 (2009) (discussing the risk poised to urban communities who have no choice but to build in floodplains in order to meet housing demands); *see* Thieken et al., *supra* note 181, at 176 (discussing the structural prevention methods that homeowners can take to mitigate inland flooding).

[184] Pörtner et al., *supra* note 18, at 21 ("For inland flooding, combinations of non-structural measures like early warning systems and structural measures like levees have reduced loss of lives . . . Enhancing natural water retention such as by restoring wetlands and rivers, land use planning such as no build zones or upstream forest management, can further reduce flood risk.").

[185] *Id.* ("The effectiveness of most water-related adaptation options to reduce projected risks declines with increasing warming.").

[186] *Id.* ("The feasibility of implementing adaptation options in the near-term differs across sectors and regions . . . The effectiveness of adaptation to reduce climate risk is

threats and nullify the effectiveness of the individual measures taken to prevent immediate damage in various sectors.[187] Climate change poses a very significant environmental threat, affecting different sectors, the consequences of which could be devastating.

As the IPCC report points out, dealing with these threats must begin or continue urgently.[188] At the same time the urgency, in this case, is different from governmental acts designed to deal with immediate damage. Thus, a regulation or act designed to prevent immediate damage may exempt the government from, or at least diminish its duty to consider, costs and distribution-related considerations. This is because the imposition of such duty may cause delays in the government action and lead to the realization of damage. On the other hand, where the environmental threat is not expected to materialize immediately, governments should be obligated to consider the efficiency of their actions and their distribution implications. Therefore, while taking measures to adapt to climate change is indeed an urgent task for governments worldwide, we need to distinguish between actions and regulations that aim to adapt to immediate threats and those designed to tackle long-term threats. While in the former, governments may be allowed to act rapidly to ward-off immediate damage, in the latter governments' actions should be more considerate, thoroughly examining social and economic considerations.

VI. HOW GOVERNMENTS SHOULD ACT IN RESPONSE TO ENVIRONMENTAL THREATS

The response of federal, state, and local governments to environmental challenges should be determined in a regulated and pre-calculated manner. Regulation that affects private property should be determined by evaluating the costs and benefits to society, the contribution of the regulation to environmental preservation, and the burdens imposed on individuals. Such an evaluation should be done before, and during, the regulatory procedures. It may affect not only the question of whether to regulate but also the scope of the regulation, its characteristics and, of course, its implications. This understanding—which rejects the ad hoc test for identifying the governmental power exercised in a particular case—is not new. The courts, despite their failure to develop a "set formula" for this purpose, have recognized the

documented for specific contexts, sectors and regions . . . and will decrease with increasing warming . . . Integrated, multi-sectoral solutions that address social inequities, differentiate responses based on climate risk and cut across systems, increase the feasibility and effectiveness of adaptation in multiple sectors.").

187 *Id.*

188 Ali et al., *supra* note 25, at 178.

potential advantages of doing so.[189] While scholars and jurists struggle to provide governments with a coherent framework for the exercise of their governing powers,[190] the purpose of this Article is more modest. Relying on the unique characteristics of environmental regulation, this Article proposes a model for dealing with the gray, shaded area of environmental regulations that harm private property.

Along with their ability to use financial mechanisms and economic incentives, governments hold two meaningful powers to tackle environmental threats: the state police power and its eminent domain power.[191] Despite the courts' attempts to make sense of the distinction between these two powers, the essence of this distinction is the compensation to which the property owners are entitled.[192] Thus, while

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[189] *See Penn Cent. Transp. Co.*, 438 U.S. 104, 123–24 (1978) ("The question of what constitutes a 'taking' for purposes of the Fifth Amendment has proved to be a problem of considerable difficulty. . . . [T]his Court, quite simply, has been unable to develop any 'set formula' for determining when 'justice and fairness' require that economic injuries caused by public action be compensated by the government, rather than remain disproportionately concentrated on a few persons.") (internal citation omitted).

[190] *See* Sax, *supra* note 35, at 37 (calling takings and regulatory law "a welter of confusing and apparently incompatible results."); Barros, *supra* note 35, at 471 ("One of the enduring puzzles in constitutional law is the problem of regulatory takings, and it has become something of a ritual to begin articles on the issue by noting the widespread confusion that the doctrine has caused."); Stoebuck, *supra* note 35, at 1057 ("No wonder then that legal and other writers . . . are busy fitting together writings on this or that aspect of the police power."); FISCHEL, *supra* note 35, at 1 (stating the purpose of the book as seeking "viable middle ground between judicial deference to the often unfair regulations that burden property owners and judicial imposition of compensation for every legislative infringement on private rights"); Singer, *supra* note 35, at 601 ("Many scholars have criticized the resulting law of regulatory takings as incoherent, unpredictable, and insufficiently protective of property rights."); Serkin, *supra* note 35, at 1260 ("For twenty-five years, courts wrestled with the relationship between substantive due process and takings."); *Pa. Coal Co.*, 260 U.S. 393, 415 (1922) (noting that "if regulation goes too far it will be recognized as a taking"); *Village of Euclid*, 272 U.S. 365, 397 (1926) (holding that zoning is a valid exercise of the state police power); *Penn Cent. Transp. Co.*, 438 U.S. at 123 ("The question of what constitutes a 'taking' for purposes of the Fifth Amendment has proved to be a problem of considerable difficulty."); *Lingle*, 544 U.S. 528, 532 (2005) (declining to apply the "substantially advances" test to determine whether a regulation is a taking requiring compensation).

[191] *See* Sax, *supra* note 35, at 36 (noting that the government may exercise its eminent domain power to take property, while "zoning, nuisance abatement, conservation, businesses regulation, and a host of other functions" may fall under the police power); Barros, *supra* note 35, at 516 ("A local government seeking to preserve a certain parcel of land as open space can exercise the police power to forbid development of that parcel or can take the parcel by eminent domain.") (internal citation omitted); Stoebuck, *supra* note 35, at 1093 (noting that most environmental regulations fall under the police power); Singer, *supra* note 35, at 636 (calling environmental laws "[k]ey examples" of valid regulatory laws under state police power).

[192] *See Pa. Coal Co.*, 260 U.S. at 413 (noting that the result of takings versus a valid exercise of the police power is compensation); *Village of Euclid*, 272 U.S. at 387 ("The ordinance now under review, and all similar laws and regulations, must find their justification in some aspect of the police power, asserted for the public welfare."); *Penn Cent. Transp. Co.*, 438 U.S. at 107 ("The question presented is whether a city may . . . place restrictions on the development of individual historic landmarks . . . without effecting a

the exercise of police power does not obligate the government to pay compensation, the use of the eminent domain power requires compensation to the owner.[193] Despite the courts' awareness of the need to allow governments to choose the governmental power they exercise in advance, courts have applied a consequential, ad hoc examination, carried out ex-post, examining the implications of the action on an individual's property.[194] As stated, courts were aware of the difficulty involved in basing the decision on the nature of the governmental action, on a consequential, ad hoc examination.[195] In order to reduce the gray and vague area created concerning governmental action that infringes on private property, courts have established three categorical rules: (1) states are exempt from paying compensation to owners in emergencies, even if authorities destroy private property;[196] (2) when the government physically invades private land it is liable to pay compensation to the owner;[197] and (3) the government must compensate a landowner when a regulation deprives the land of all economic value.[198] While these rules reduce the obscure space concerning governmental actions that infringe on private property, they do not eliminate it. Practically speaking, most environmental regulations are not covered by one of these three categorical rules. This raises several questions, specifically: How and to what extent can private property be regulated when dealing with environmental challenges? How can governments know in advance what governmental power they should use to achieve their environmental goals? Furthermore, in which cases is it appropriate to pay compensation to affected landowners?

'taking' and requiring the payment of 'just compensation.'"); *Lingle*, 544 U.S. at 544 (noting that the case was not "sound under the Takings Clause" because "Chevron . . . does not seek compensation for a taking of its property").

193 Sax, *supra* note 35, at 36.

194 *See Penn Cent. Transp. Co.*, 438 U.S. at 124 (calling the Court's prior takings jurisprudence "essentially ad hoc, factual inquiries" based on the circumstances of each case).

195 *See id.* ("[T]his Court, quite simply, has been unable to develop any 'set formula' for determining when 'justice and fairness' require that economic injuries caused by public action be compensated by the government.").

196 *See, e.g.*, *Caltex*, 344 U.S. 149, 154 (1952) ("[T]he common law had long recognized that, in times of imminent peril—such as when fire threatened a whole community—the sovereign could, with immunity, destroy the property of a few that the property of many and the lives of many more could be saved.") (internal citation omitted).

197 *See, e.g.*, *Cedar Point Nursery*, 141 S. Ct. 2063, 2073 (2021) ("[T]he Court has long treated government-authorized physical invasions as takings requiring just compensation.").

198 *See, e.g.*, *Agins*, 447 U.S. 255, 260 (1980) ("The application of a general zoning law to particular property effects a taking if the ordinance does not substantially advance legitimate state interests . . . or denies an owner economically viable use of his land.") (internal citations omitted); *Lucas*, 505 U.S. 1003, 1016 n.6 (1992) ("The cases say, repeatedly and unmistakably, that '[t]he test to be applied in considering [a] facial [takings] challenge is fairly straightforward. A statute regulating the uses that can be made of property *effects a taking if it 'denies an owner economically viable use of his land*.'") (emphasis in original) (internal citation omitted).

Since most attempts in the literature to conceive the differences between the state's police power and its eminent domain power have failed, it may be worthwhile to start the investigation from the opposite direction—from the legal result of each governing power. Under the current law, exercise of state police power does not require the state to provide compensation, while exercise of eminent domain power does.[199] Since compensation to the landowner is at the core of the distinction between these two governmental powers, courts should consider what justifies compensation in the first place. The ruling and literature established two principle justifications for the governments' obligation to compensate owners in takings: efficiency and fairness.[200] The justification for efficiency suggests that compensation is required to prevent the authorities from falling into a fiscal illusion while refraining from internalizing all the economic and social costs of their actions.[201] According to the efficiency justification for compensation, the Fifth Amendment's just compensation requirement enables the authorities to assess, in advance, the costs of their actions and to realize the needs of the public at the same time.[202] The fairness justification for compensation, on the other hand, focuses on the owners and questions their obligation to bear this burden alone for the needs of the community.[203] This justification carries a consequential dimension, as it examines the damage that the owner will bear to realize the community's needs. However, even the fairness justification for compensation is not

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[199] Sax, *supra* note 35, at 36.

[200] *Armstrong*, 364 U.S. 40, 48–49 (1960); Levine-Schnur & Parchomovsky, *supra* note 96, at 438, 462–63.

[201] Levine-Schnur & Parchomovsky, *supra* note 96, at 438; William A. Fischel & Perry Shapiro, *A Constitutional Choice Model of Compensation for Takings*, 9 INT'L REV. L. & ECON. 115, 115 (1989); Christopher Serkin, *The Fiscal Illusion Zombie: The Undead Theory of Government Regulatory Incentives*, 66 AM. U. L. REV. 1433, 1436 (2017) (applying the Takings Clause "suggests that the government should bear the cost of its actions and that forcing the government to pay compensation for the regulatory harms it imposes will induce efficient regulatory incentives") (internal citation omitted). *But cf*. Bethany R. Berger, *The Illusion of Fiscal Illusion in Regulatory Takings*, 66 AM. U. L. REV. 1, 4 (2016) (arguing that compensation for regulatory takings is unnecessary because property taxes provide a mechanism through which governments internalize the costs and benefits of their property regulations).

[202] Levine-Schnur & Parchomovsky, *supra* note 96, at 438 ("[T]he just-compensation requirement is necessary to remedy a fiscal-illusion problem that would otherwise afflict government officials. Under this theory, government officials ignore costs that are not reflected in the budget. Consequently, they do not take account of the costs that their actions impose on private parties as long as those costs do not affect their budget. Government officials, who suffer from fiscal illusion, so the argument goes, will likely engage in inefficient exercises of eminent domain since they see only the public benefit of takings while ignoring the cost to condemnees. The imposition of a requirement to pay just compensation remedies the problem by incorporating the private cost of takings into the budget and forcing government officials to take full account of it.") (internal citation omitted).

[203] *Armstrong*, 364 U.S. at 49 ("The Fifth Amendment's guarantee that private property shall not be taken for a public use without just compensation was designed to bar Government from forcing some people alone to bear public burdens which, in all fairness and justice, should be borne by the public as a whole.").

entirely consequential since it allows the government to plan its actions while thinking about decentralizing the damage. The efficiency and fairness justifications for compensation make it clear that the choice of governmental power exercised in each case should be made *before* the government acts and not in an ex-post manner. These justifications also allow us to understand the distinction between the state police power and its eminent domain power.

Understanding that the compensation of landowners is due to efficiency and fairness, the three categorical rules set by the Court makes sense. In emergencies, the Court instructs the authorities to ignore the costs of their activities and the extent of the burden imposed on the owner.[204] This rule is based on recognition that emergencies require urgent action to prevent damage—an activity prompted by an emergency is not and, more importantly, should not be affected by costs or distribution considerations.[205] The Court has also ruled that a physical invasion of private land or a regulation that denies all economically viable use of one's property obligates the government to compensate affected property owners so that the government internalizes the costs of its activities and assimilates distribution considerations.[206] These categorical rules, however, leave a wide range of government actions designed to deal with environmental threats, and questions the government's liability for landowner compensation.[207] The main argument of this Article is that the unique characteristics of environmental regulation allow for the determination of a set formula to characterize the activities of the government. Thus, in cases where no categorical rule applies—where there is no emergency, no physical invasions of private property, nor regulations that deny all economically viable use of one's property—the government can know in advance the results of its activities and its obligation to compensate property owners.

As mentioned, there are four unique characteristics of environmental regulation: urgency, irreversibility, uncertainty, and cross-border damage.[208] Environmental regulation reveals two senses of urgency: to prevent immediate damage, and to incentivize an action to prevent long-term damage. Insofar as the government action designed to prevent immediate damage, it should be perceived as an emergency to which the categorical rule of no-compensation applies. In cases where contemporary

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204 *See* Lee, *supra* note 63, at 393 (noting courts routinely hold that the destruction of private property in an emergency is excusable and does not require compensation).

205 *See id.* at 413 ("[I]n the emergency-destruction context, that same requirement to pay compensation is condemned as discouraging government officials from taking property often enough.").

206 *Lucas*, 505 U.S. 1003, 1014 (1992) ("If, instead, the uses of private property were subject to unbridled, uncompensated qualification under the police power, 'the natural tendency of human nature [would be] to extend the qualification more and more until at last private property disappear[ed].'") (citation omitted).

207 *See, e.g.*, *Palazzolo*, 533 U.S. 606, 616 (2001) (concluding that 94% diminution in value of land is not a categorical taking).

208 *See* discussion *supra* Part V.

action can prevent future long-term damage, a different rule is required. In cases where the action aims to prevent long-term damage, we must examine the other characteristics of environmental regulation in order to determine the owner's entitlement to compensation.

The other three characteristics maintain a complex relationship but may provide governments with a roadmap to calculate their environmental regulation. Based on the understanding that the compensation requirement aims to direct the government's economic and distributive activities, such a roadmap should begin with identification of landowners' obligations toward others.[209] Environmental regulations often challenge these obligations while imposing restrictions on property owners to prevent damage that will materialize outside the boundaries of the owners' community, state, and even their continent. Cross-border damage challenges the economic efficiency of imposing environmental regulation but, more importantly, it questions its distributive consequences and fairness. Taking the justification of fairness and the prevailing understanding in property law regarding owners' obligations to others seriously, the more the regulation is designed to prevent damage to the community to which the owner belongs the higher their obligations will be, and their entitlement for compensation decreases. On the other hand, to the extent that the damage the regulation deals with is cross-border and not expected to materialize only in the community to which the property owners belong—the owners' liability decreases and their entitlement to compensation increases. Therefore, examining the distance between where restrictions are imposed on private property and where the damage materializes informs the extent of the owners' obligation to others and their entitlement to compensation. Such an examination incorporates the fairness justification for compensation as it allows governments to properly distribute the burdens imposed on property owners dealing with the challenges of the environmental regulation.

However, fairness is not the only justification for compensation for takings. As many legal and economic scholars have argued, this compensation forces the government to internalize all the costs of its actions.[210] According to this argument, if the government is not required to pay compensation to the property owners it will disproportionately and inefficiently harm private property because it will run into a fiscal illusion that its actions do not bear any cost.[211] The distance between the place of regulation and where the damage materializes provides governments with an incentive to internalize the costs involved in regulation. Governments are encouraged to ascertain the costs of regulation for cross-border damages because, in such cases, governments bear the costs of

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209 *See* discussion *supra* Part V.C.

210 RICHARD A. EPSTEIN, BARGAINING WITH THE STATE 84–85 (1993); RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW 56–57 (9th ed. 2014).

211 EPSTEIN, *supra* note 210, at 85; POSNER, *supra* note 210, at 56.

preventing damage to (and, therefore, profit for) other jurisdictions.[212] However, this incentive does not guarantee that governments will internalize all costs of environmental regulations, mainly because such regulations are often done in conditions of scientific uncertainty and with fear of irreversible damage.

Scientific uncertainty and concerns about the irreversible nature of the environmental damage encourage authorities to impose restrictions and act now to leave a margin of discretion in the future. As Professor Sunstein argues, the fear of irreversibility reflects the acquisition of an option for future dealings so that decision-makers will impose regulations—including ones that harm private property—to preserve future discretion.[213]

The desire of decision-makers to preserve future discretion—a desire that law and economic scholars define as an "option cost"[214]—works in a way that does not incentivize governments to internalize all the costs of environmental regulation. Incorporating the precautionary principle as a fundamental principle of environmental regulation—that is, the call to not wait for a solid scientific basis—clarifies that governments should act even in situations where they are unsure of the total costs of their activities. This situation undermines the ability of governments to internalize all the costs involved in environmental regulation and requires that, in some cases, they are liable for compensation to the property owner. As stated, the justification for efficiency holds that the purpose of compensation is to verify that the government is aware of the total costs of its activities.[215] Since governments are encouraged to preserve a future option, it is not clear that they can be aware of the total cost of their activities without also knowing their liability to landowners for compensation. When then, do authorities fall into fiscal illusion? The answer lies in the scientific certainty concerning the environmental threat, its chances of realization, and its scope.[216] It also depends on the decision-makers' estimate concerning the irreversibility of the expected damage. The rule in this matter should be that if only one of the two is realized—that is, either the damage is not yet scientifically sound, or the

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[212] John Edward Carroll, *Introduction*, *in* INTERNATIONAL ENVIRONMENTAL DIPLOMACY: THE MANAGEMENT AND RESOLUTION OF TRANSFRONTIER ENVIRONMENTAL PROBLEMS 1, 1 (John Edward Carroll ed., 1988) ("A transboundary environmental problem arises when all or most of the benefits of any pollution-emitting activity accrue to one nation, while all or most of the costs of that activity accrue to the nation across the border. It is the existence and the location of the border, therefore, and the imbalances or asymmetries in costs and benefits that result between two (or more) nations, which defines the existence of transboundary environmental problem.").

[213] Sunstein, *supra* note 121, at 231–33.

[214] Arrow & Fisher, *supra* note 139, at 319 (stating that option costs are "the expected benefits of an irreversible decision should be adjusted to reflect the loss of options it entails") (citation omitted); Sunstein, *supra* note 121, at 230–34.

[215] Levine-Schnur & Parchomovsky, *supra* note 96, at 438.

[216] The determination of the amount of scientific knowledge required to establish that the scientific basis is certain must remain in the hands of scientists and experts in environmental threats.

damage is irreversible—governments regulate to buy an option because they are encouraged not to internalize all the costs of environmental regulation. The reason for such exemption derives from the efficiency justification for compensation. When governments operate on solid scientific ground, they can adequately assess the totality of the costs involved in regulation. When all costs are internalized, there is no justification for charging the state compensation as it will operate effectively. In order to illustrate the applicability of the model, I have summarized the range of possibilities in the table below.[217]

VII. CONCLUSION

Governments at the national and local levels often find themselves limited when addressing growing environmental challenges. Current property laws comprise a significant portion of the restrictions placed upon authorities dealing with environmental challenges. These laws do not provide advance notice of the costs involved in implementing an environmental regulation, or its distributive consequences. Under the current law, which governmental power is exercised in the face of an environmental challenge, and the extent of government liability to compensate property owners harmed by regulation, is examined only consequently via ad hoc.[218] This policy, formulated by the courts,[219] adversely affects governments, property owners, and the environment.

The model proposed in this Article suggests that consideration of the unique characteristics of environmental regulation can inform policy that gives decision-makers advance knowledge regarding the costs and distributive consequences of their activities. Authorities can act efficiently and fairly when they understand the unique characteristics of environmental regulation. This understanding can then provide guidance for governments when addressing pressing environmental challenges and remove ambiguity from their decisions.

The model proposed in this Article also focuses on environmental regulation that harms land, whether through expropriation or imposition of restrictions of its use. However, environmental regulation has implications for private property that exceeds land. For example, environmental regulation may harm the economic activity of businesses whose activity is perceived as harming the environment. The current law addresses this harm to private property either through economic mechanisms and financial incentives or through mechanisms of

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217 *See infra* Tbl. 1.

218 *See Keystone Bituminous Coal Ass'n*, 480 U.S. 470, 495 (1987) (explaining the need for ad hoc determinations for just compensation).

219 *See* Rose-Ackerman, *supra* note 16, at 1700–01 (discussing how the doctrines created by courts also created a "uncertainty [that] is exacerbated by the ex post nature of court decisions.").

"grandfathering," which prevent active harm to existing businesses.[220] These mechanisms carry advantages, but they do not seem to provide an effective and fair response to the rapid pace of development of environmental threats and the urgent need to address them. Although this Article does not deal with regulations that infringe on non-land property, future research should expand the examination of the mechanisms used in such regulations, the costs of using them, and their distributive consequences. As with environmental regulation that harms private land, a regulation that harms non-land property requires compliance with current property laws to enable authorities to deal effectively and fairly with environmental challenges.

[220] *See generally* Maria Damon et al., *Grandfathering: Environmental Uses and Impacts*, 13 REV. ENV'T ECON. & POL'Y 23, 23–25 (2019) (defining Grandfathering, and explaining its history and uses).

Table 1: When Governments Should Pay Compensation to Owners for Environmentally Regulating Their Property

	Certainty The Scientific Confirmation of the Threat and Its Scope	**Irreversibility** The Possibility of Recovery from Damage	**The Governmental Power Exercised and the Property Owner's Entitlement to Compensation**
Local Damage	Certain	Irreversible	Police power (no compensation)
	Certain	Reversible	Takings (compensation)
	Uncertain	Irreversible	Takings (compensation)
Cross-border Damage	Certain	Reversible	Takings (compensation)
	Uncertain	Irreversible	Takings (compensation)
	Uncertain	Reversible[221]	The government has no power to infringe on private property

[221] A threat can be recognized as reversible even if the scientific knowledge regarding the threat is not solid enough. These are usually environmental threats that do not leave a long-term mark. In such cases, as the model suggests, authorities will not be able to harm private property except in one of the following ways: the use of economic incentives or restrictions agreed upon by the property owners.